TECHNOLOGY DEPT.

Gas Journal

Vol. 265. 103rd Year. LONDON, FEBRUARY 7, 1951. No. 4575. Price 1/-

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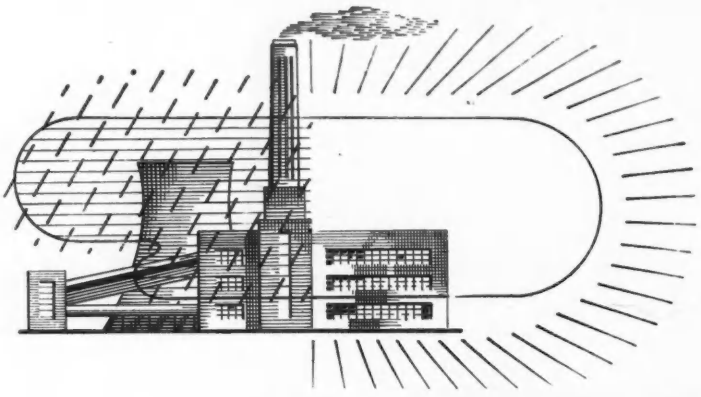
DETROIT

EXHIBITION OF THE WORKS OF INDUSTRY
OF ALL NATIONS 1851
I hereby certify that Her Majesty's Commissioners
upon the Award of the Jurors have presented a Prize Medal to
T. Glover
for a Gas Meter
shewn in the Exhibition
Exhibition
Hyde Park London, 15th Oct.r 1851
Albert
President of the Royal Commission



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Between October and March is proverbially the time to be on the look-out for chilling winds and stormy weather. Yet bad weather *cannot* be dated. From time to time it makes its rounds . . . 365 days of the year. What paint can be expected to stand up to such constant changes, and keep exposed iron and steel work completely rust proof — every day of the month, all twelve months of the year? Only a paint with sufficient elasticity to expand and contract under varying temperatures without cracking —AVARC SILICA-GRAPHITE PAINT. It is unsurpassed for the protection of all iron and steelwork.

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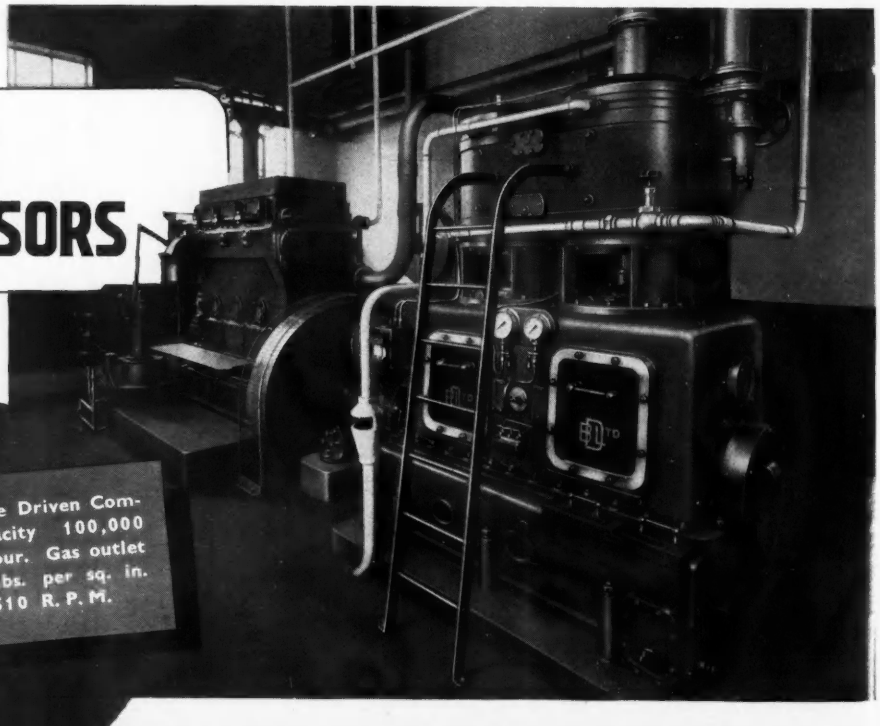
GAS COMPRESSORS



Gas-Oil Engine Driven Compressor, capacity 100,000 Cub. ft. per hour. Gas outlet pressure 15 lbs. per sq. in. Running at 510 R. P. M.

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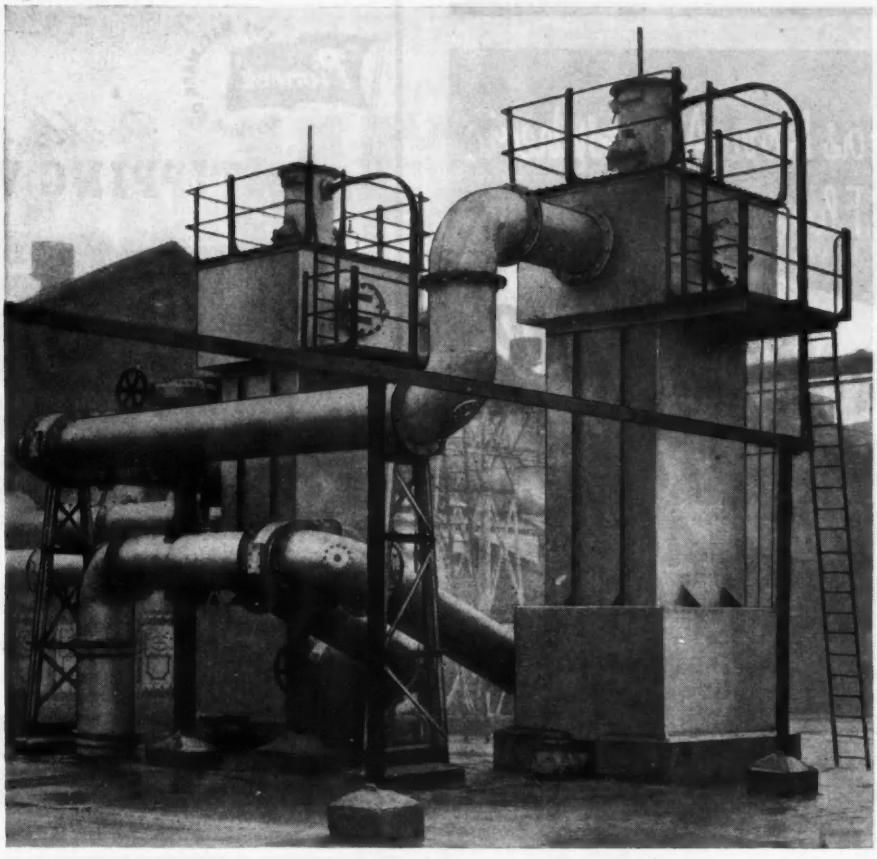

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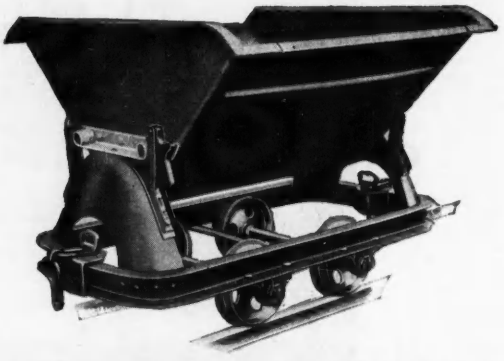

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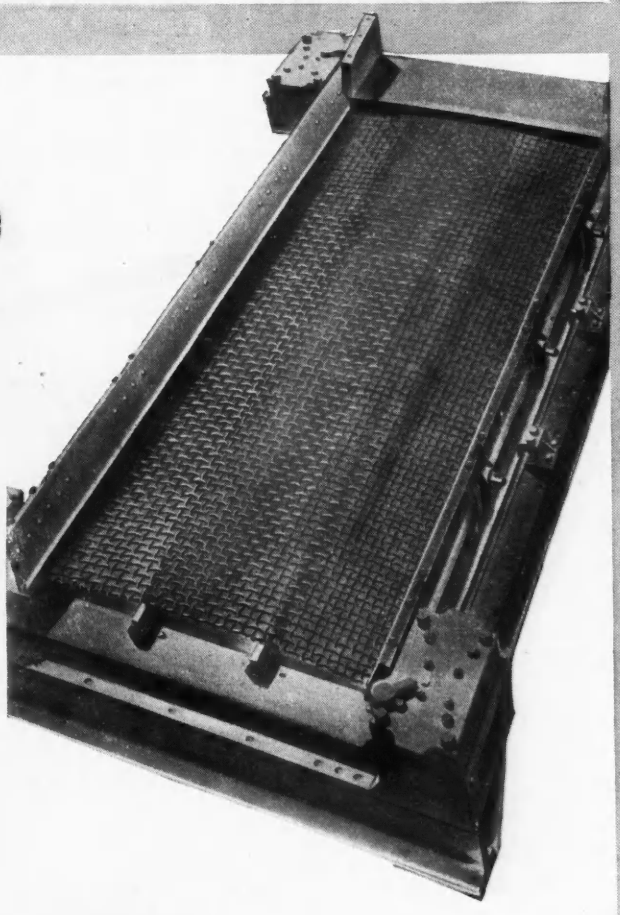
Designed for accurate and trouble-free fine screening at low cost



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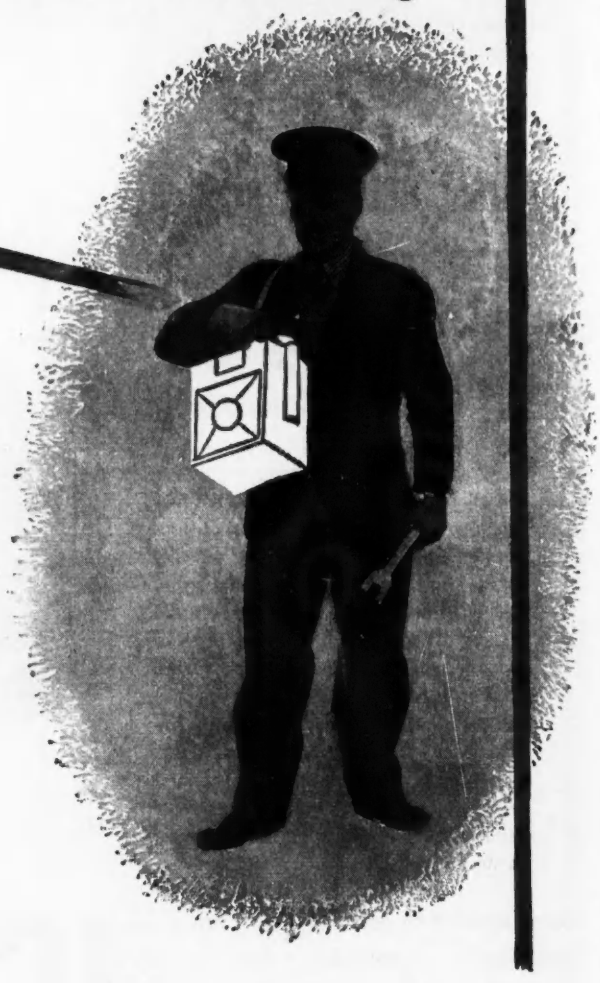

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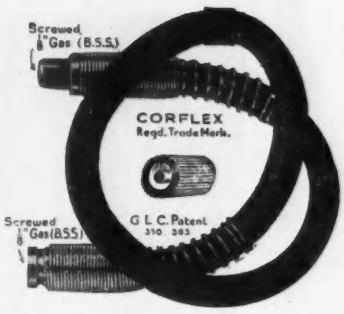

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Cannot be crushed by any normal pressure.

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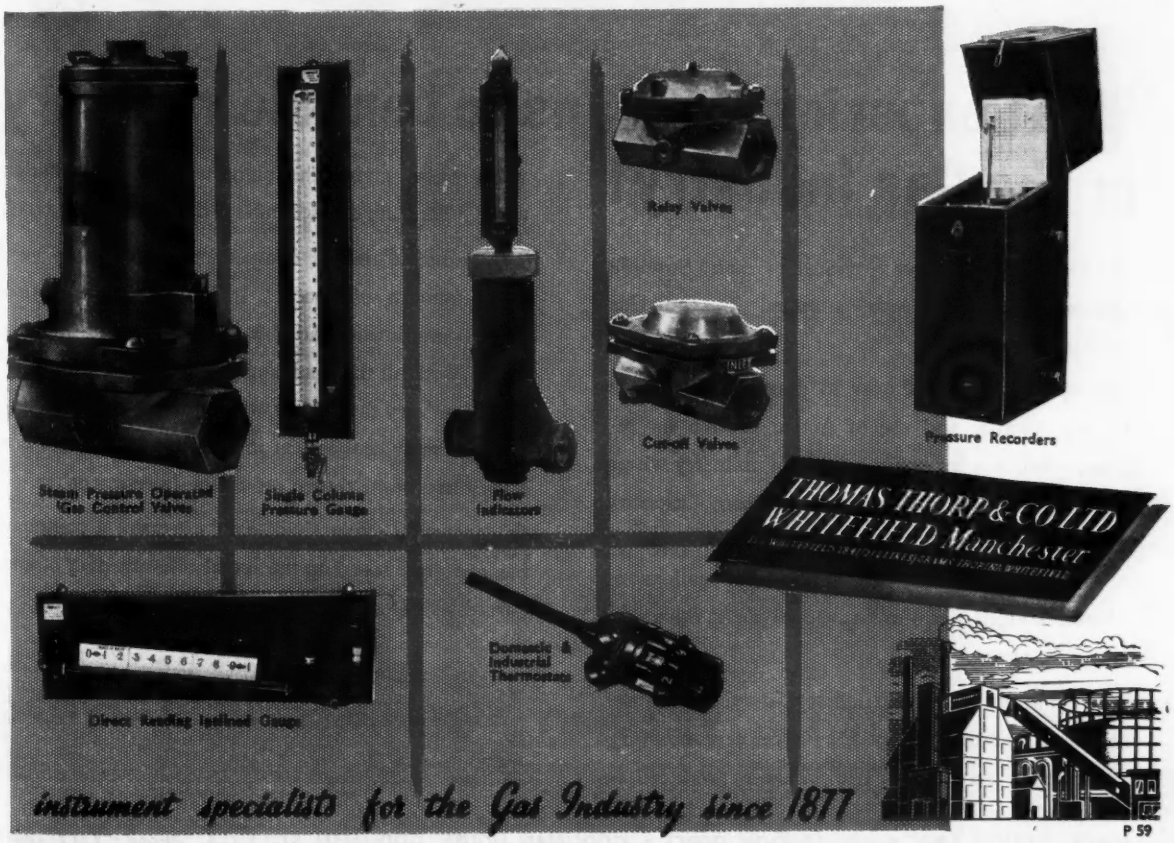

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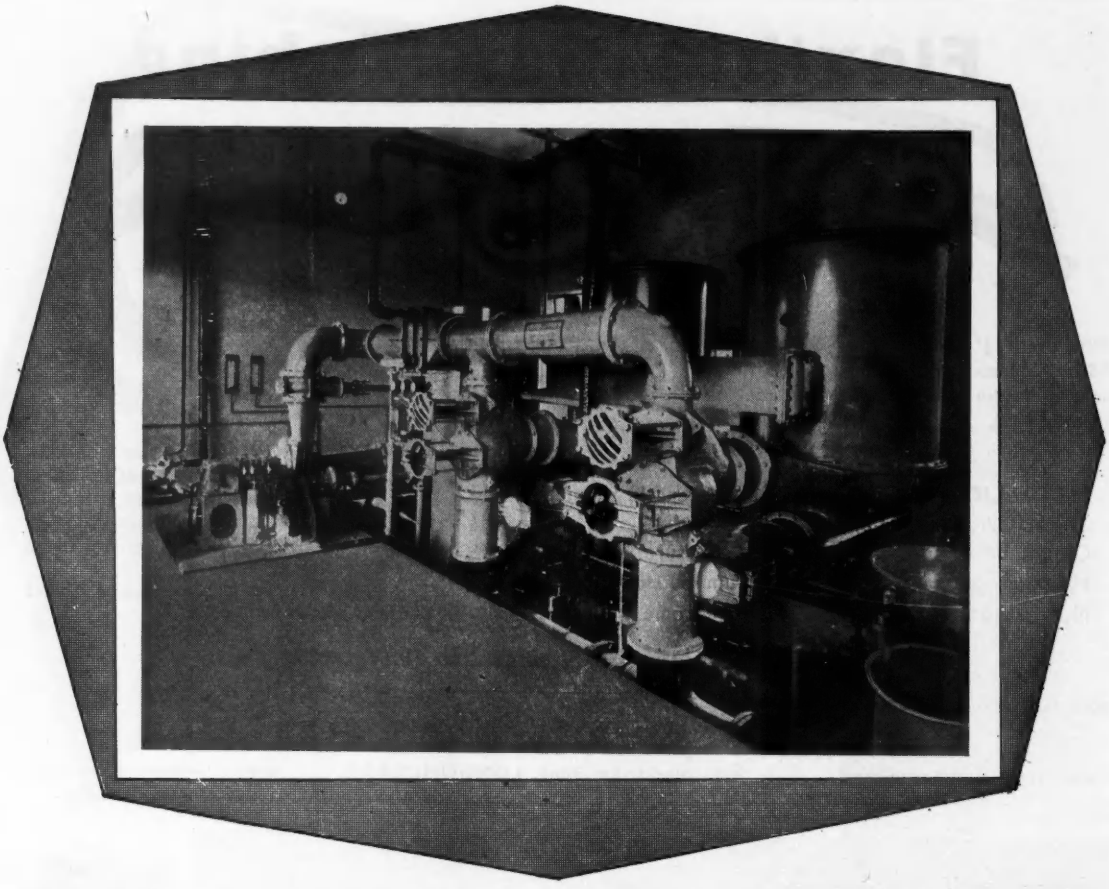

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The plant you see above is typical of many Sutcliffe Speakman plants already supplied to the Gas Industry.

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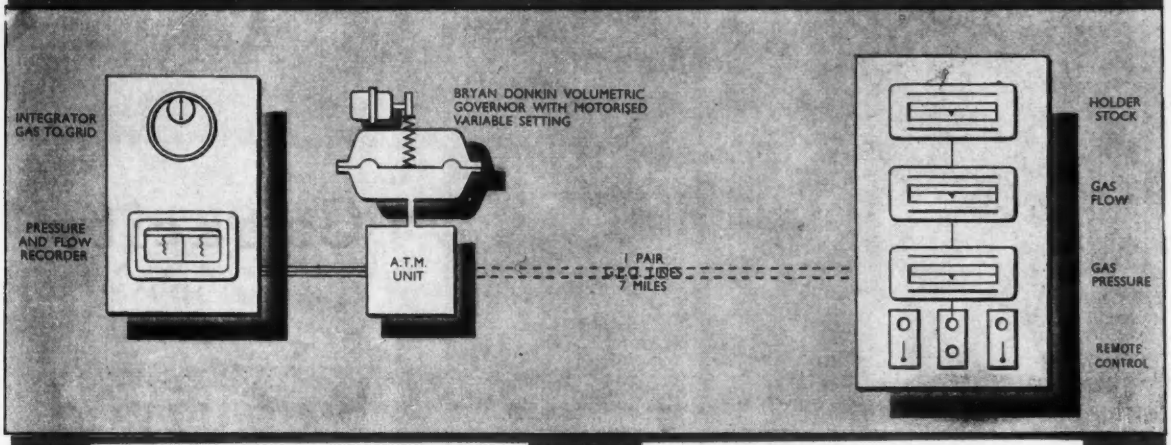
REMOTE HOLDER-STATION CONTROL—SHEFFIELD GAS UNDERTAKING



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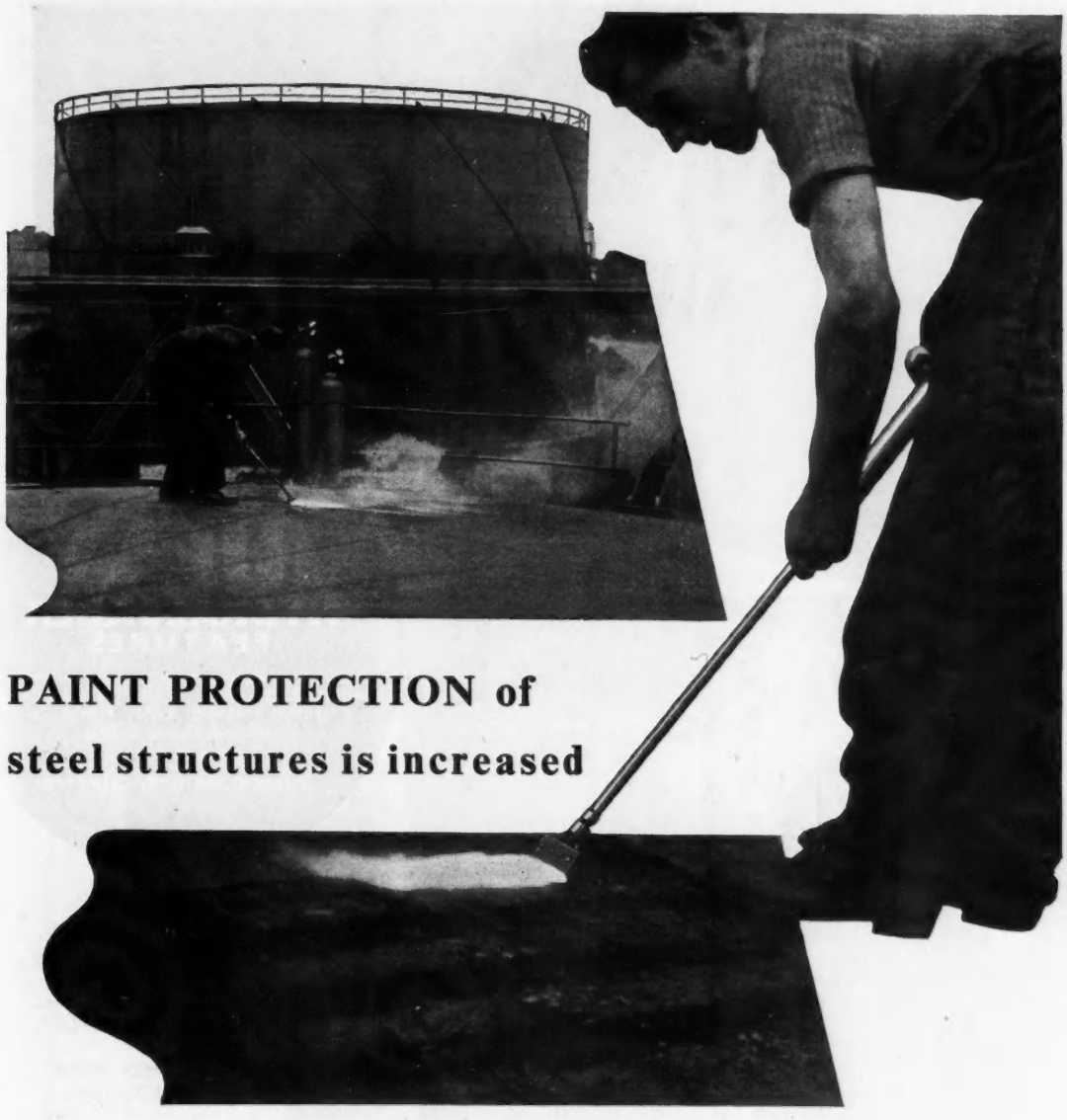

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On a dirty, rusty or damp steel surface, paint bonds badly, and usually starts to scale off after a comparatively short life. But on a clean, dry and warm surface, it bonds to perfection. To prepare such a surface is a simple matter when the Oxy-Acetylene Flame Cleaning Process is employed. It loosens and removes surface scale and corrosion and thoroughly dries the steel, leaving it in an ideal condition for the application of paint. Flame Cleaning increases the durability of the paint coat thereby reducing maintenance cost. Full technical details are gladly supplied. Write for Booklet T.1.B. No. 11.

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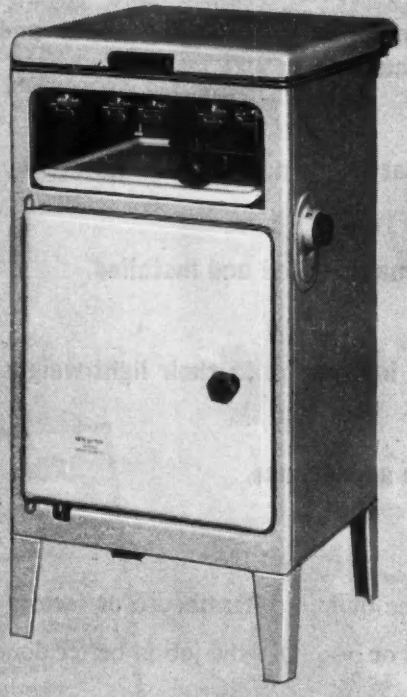

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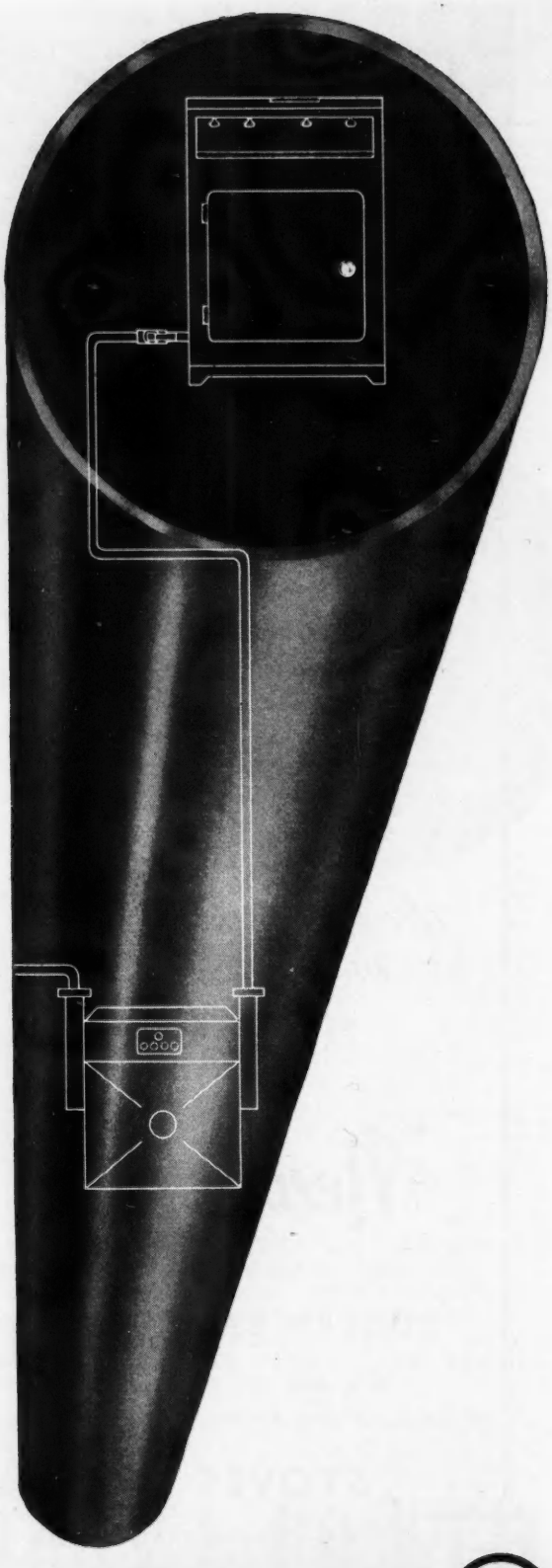

For domestic gas systems, light gauge copper tubes made by the Metals Division of I.C.I. have five obvious advantages. They are:—

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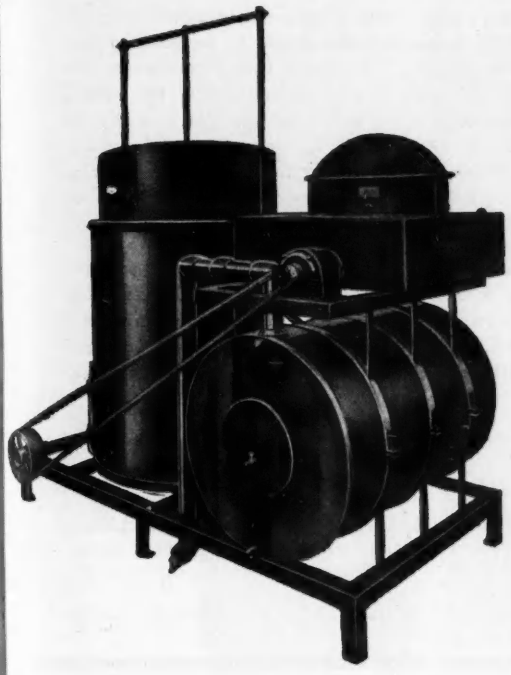

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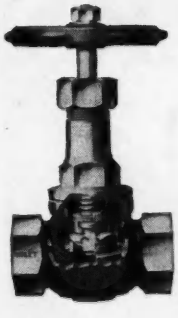
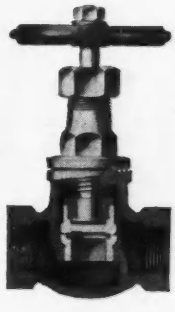


'MAC' VALVE



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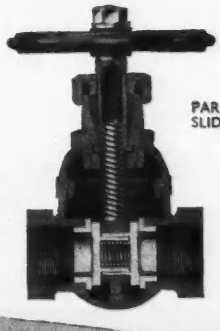
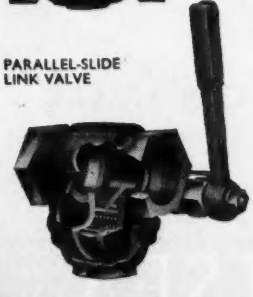


PARALLEL-SLIDE LINK VALVE



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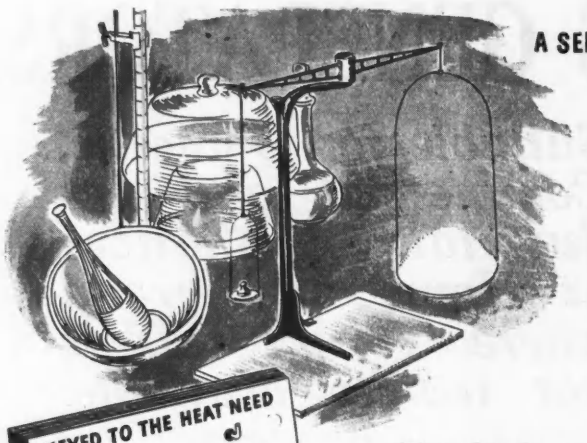

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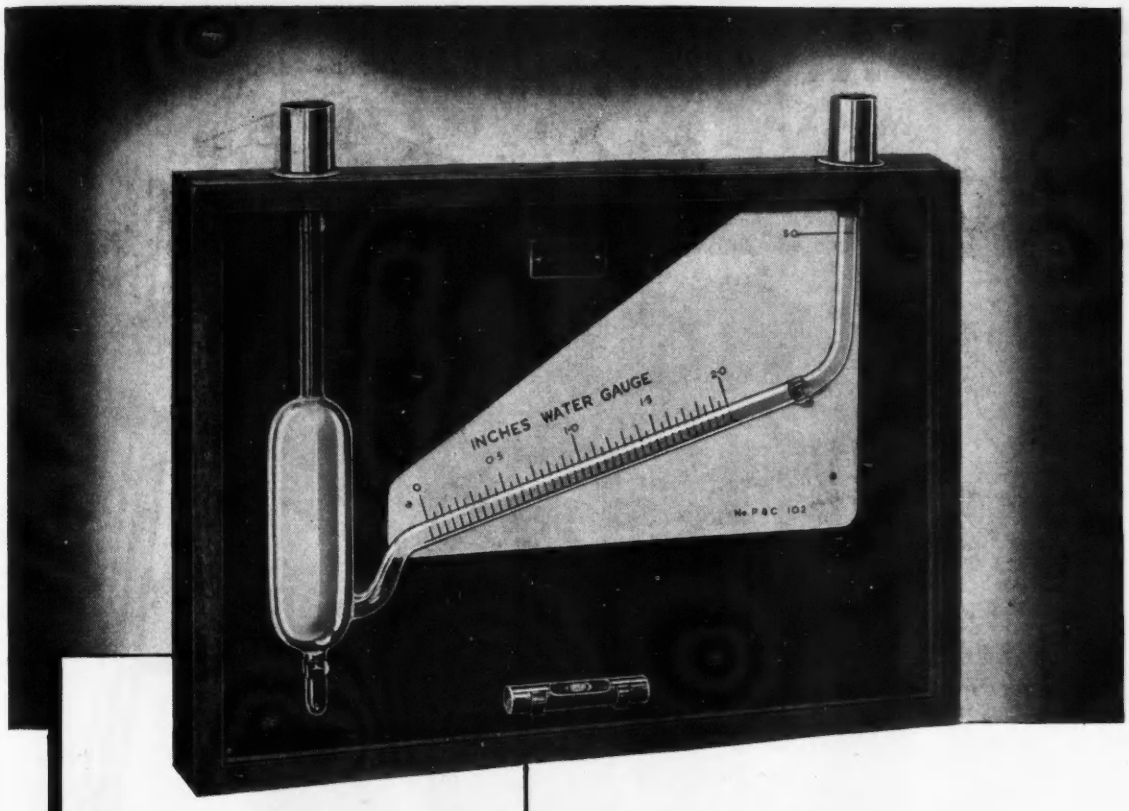

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INCLINED TYPE

MANOMETER

To the approved specification of the Ministry of Fuel and Power

Each instrument is fitted with a scale individually calibrated against its own manometer. The scale is graduated in twentieths of an inch from 0″ to 2″ w.g., and there is, in addition, a 5″ w.g. graduation for leakage tests.

The tube and reservoir are secured by spring clips and mounted on a high quality polished mahogany cabinet 13½″ x 9¾″ x 2½″, with removable top section, to which is fitted two brass collars for protecting the ends of the tubes.

A supply of di-butyl oxalate (Specific Gravity 0.985) is included for use as manometric liquid.

We shall be glad to submit quotations for early delivery.

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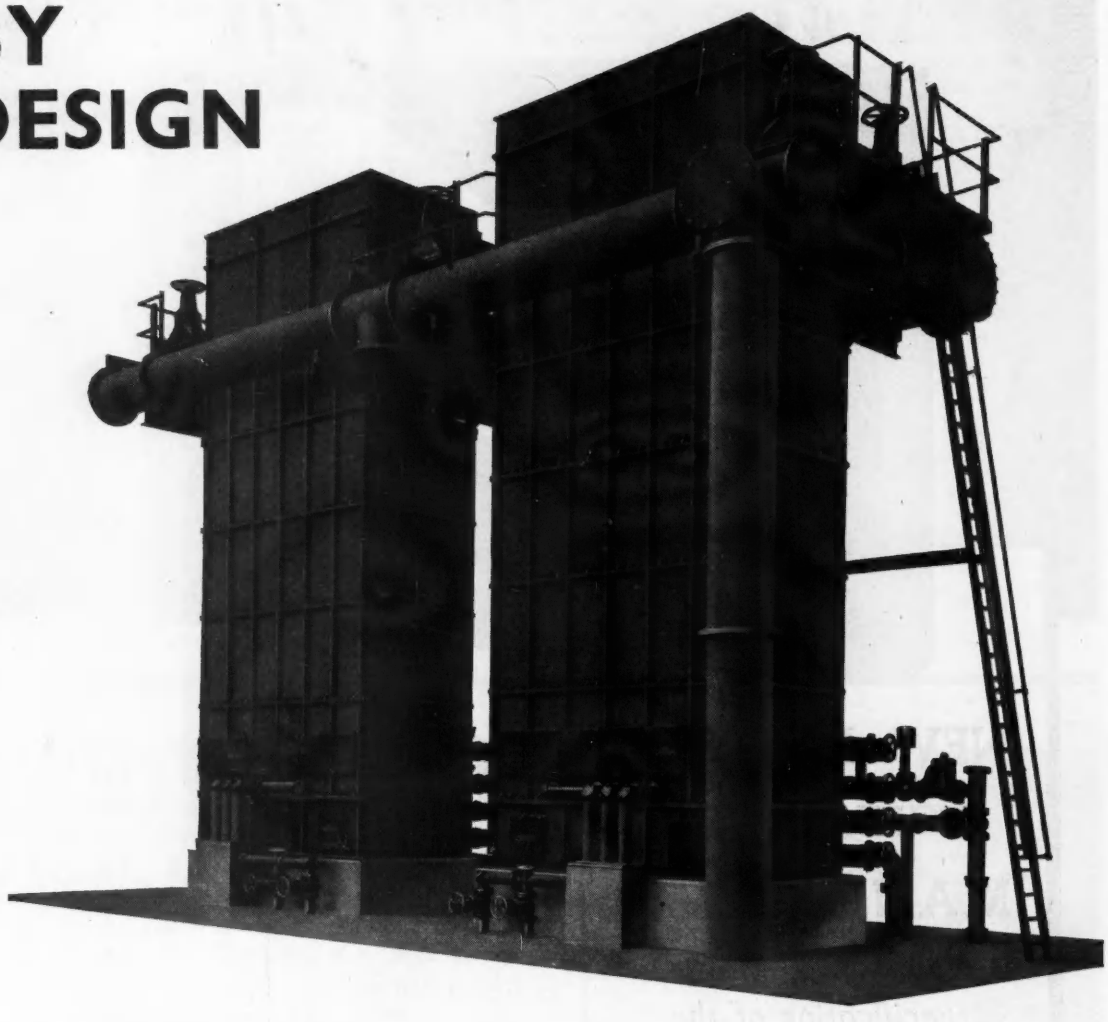
PERFORMANCE BY DESIGN



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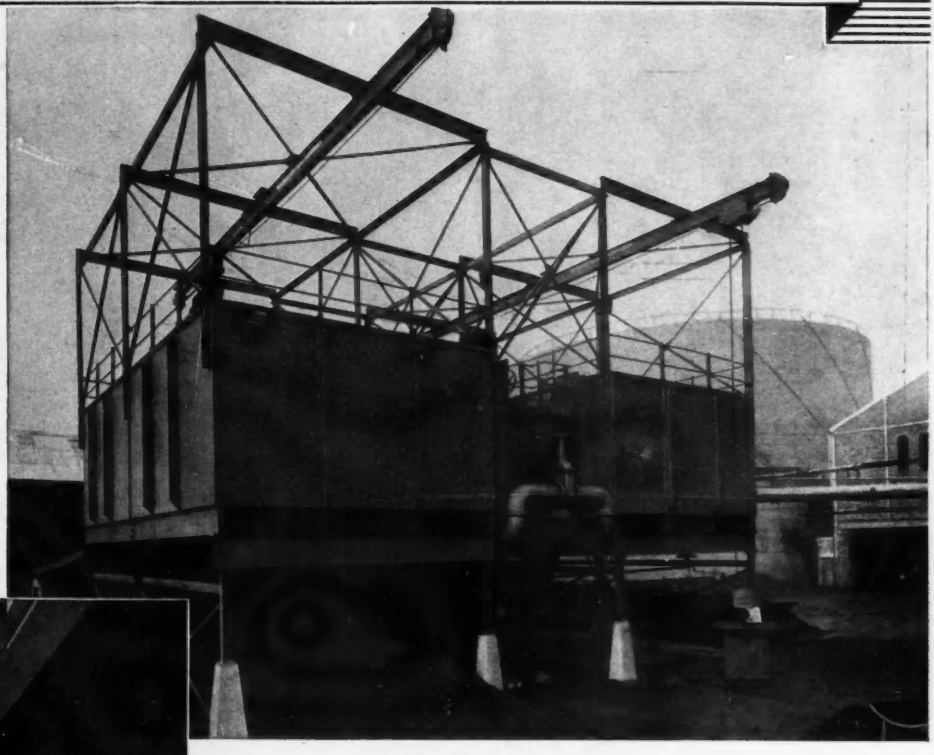
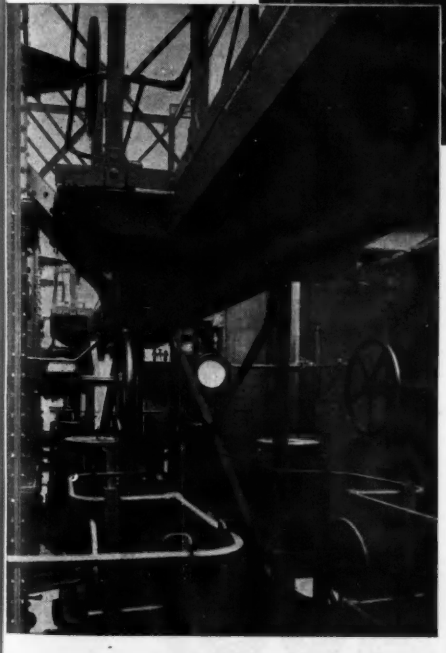
Whessoe Purifiers





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This is a simple installation with modern features—deep, welded mild-steel, overground boxes, with divided and reversible gas flow. Simple and efficient charging is provided by Morris 3-ton skips, operated by pulley-blocks, with hoisting and traversing controlled by an electrically driven winch, which is also arranged to provide for cover-lifting.

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In 'Fibreglass' Staple Tissue the fibres are bonded to form a thin, pliable tissue with special advantages in pipe wrapping.

ITS ADVANTAGES Staple Tissue possesses uniform porosity which allows rapid and even penetration and complete impregnation with bitumen. It thus adds to the effectiveness of the coating, allows the bitumen to spread evenly, eliminates all air pockets and gives complete adhesion to the surface in pipe wrapping.
It is rotproof, fireproof, acid resisting; is unaffected by bacteria, fungoid growths, organic solvents and soil acids; and has the high electrical resistance which is very important in pipe wrapping.
The construction and the arrangement of the non-cellular fibres in Staple Tissue mean that no oils are wicked from the bitumen and ensure a longer life for the coating. Since 'Fibreglass' Staple Tissue cannot absorb moisture it does not swell or shrink with humidity changes, so a 'Fibreglass' wrapping means no loosening of the covering from moisture attacks.
It is easily applied and light in weight. Its lightness allows it to be supplied in longer rolls than other materials used for the same purposes and the length of the rolls saves time and labour in application as fewer stops and joins have to be made.
Its breaking strength allows winding at high speed by standard wrapping machinery at normal machine tension and it carries the normal load of bitumen impregnant without strain.
'Fibreglass' Staple Tissue is largely used as an anti-corrosive for underground pipes; small bore pipes are wrapped at the mill, and large pipes on the site.
Staple Tissue is suited to both methods of wrapping—and takes bitumen at a temperature of 450°F without turning a glass hair!

STAPLE TISSUE WRAPS THE PIPELINE Some 15,000,000 square feet of 'Fibreglass' Staple Tissue have already been used for oil pipelines in the Middle East. The above photograph shows a length of oil pipe in process of being wrapped.

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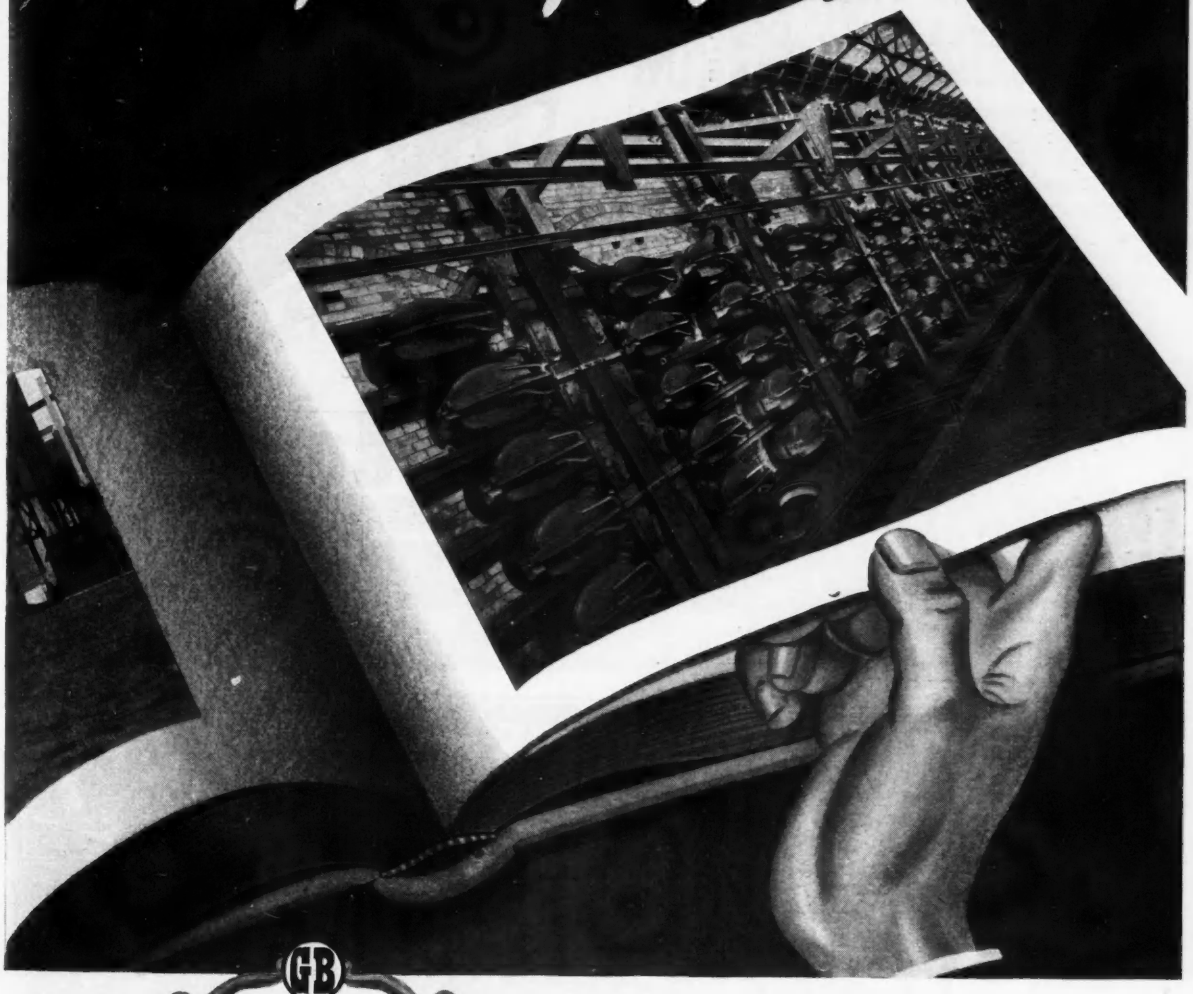

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SINGLE LEVER *Model B 2106 SL*
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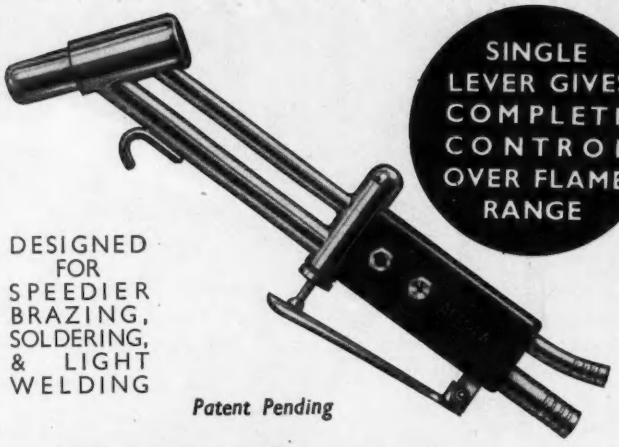
Fully illustrated Folder No. BL209 will be sent on request.



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DESIGNED FOR SPEEDIER BRAZING, SOLDERING, & LIGHT WELDING

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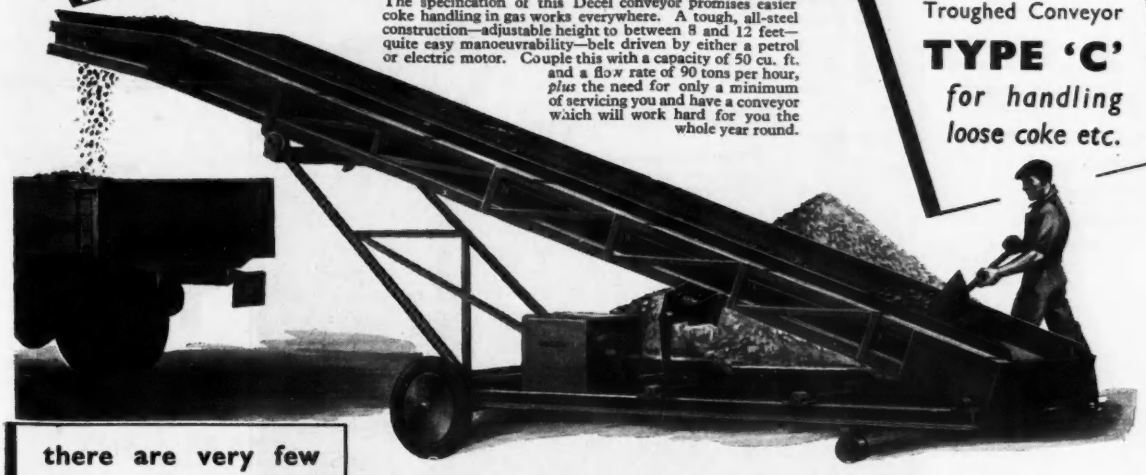
TYPE 'C'
for handling loose coke etc.



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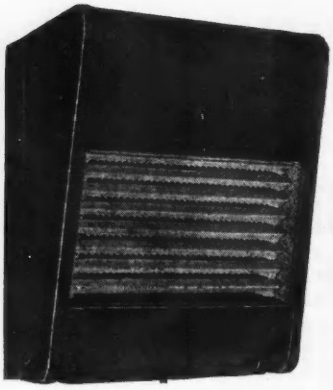

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Those engaged on the planning and construction of our great buildings must devote their genius to more down-to-earth subjects than heavenly bodies but they too are apt to marry names and thoughts into single phrases. And in many circles Foundation Piling has become simply . . . FRANKIPILES. This "cast-in-situ" word expresses one concrete idea . . . the safest, quickest and most economical method of piled foundations yet discovered — a system which has achieved world-wide success on building projects of the greatest magnitude.

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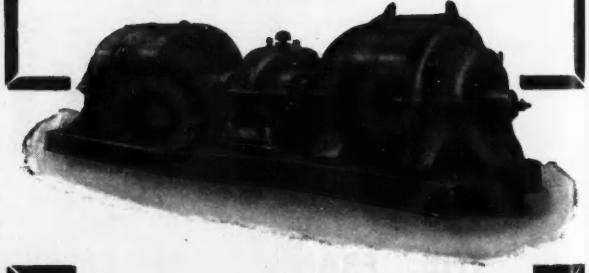

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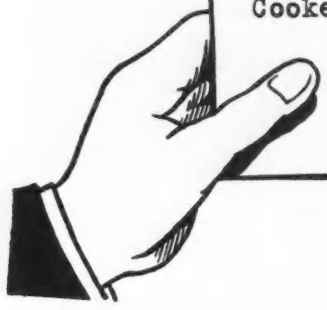

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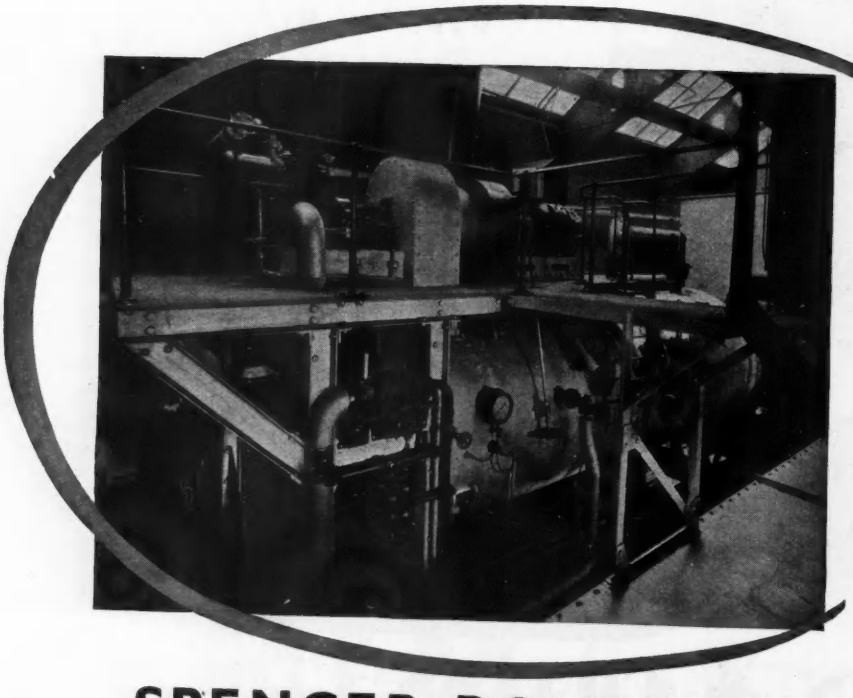

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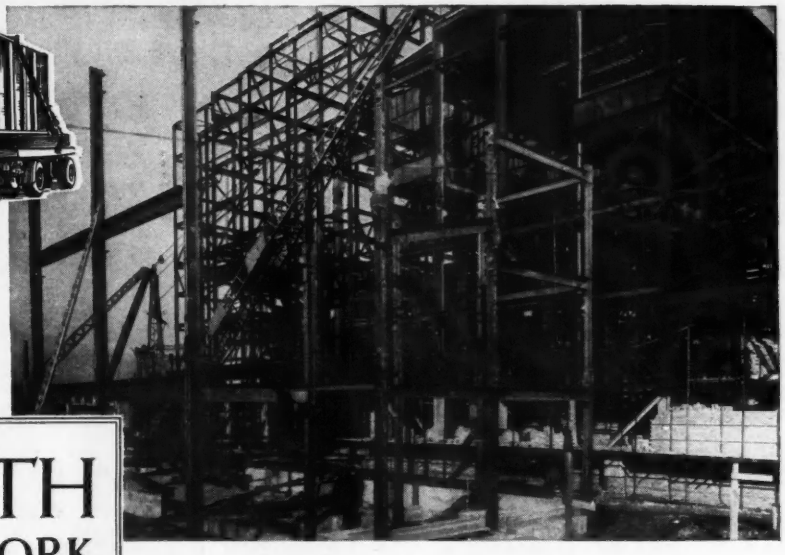

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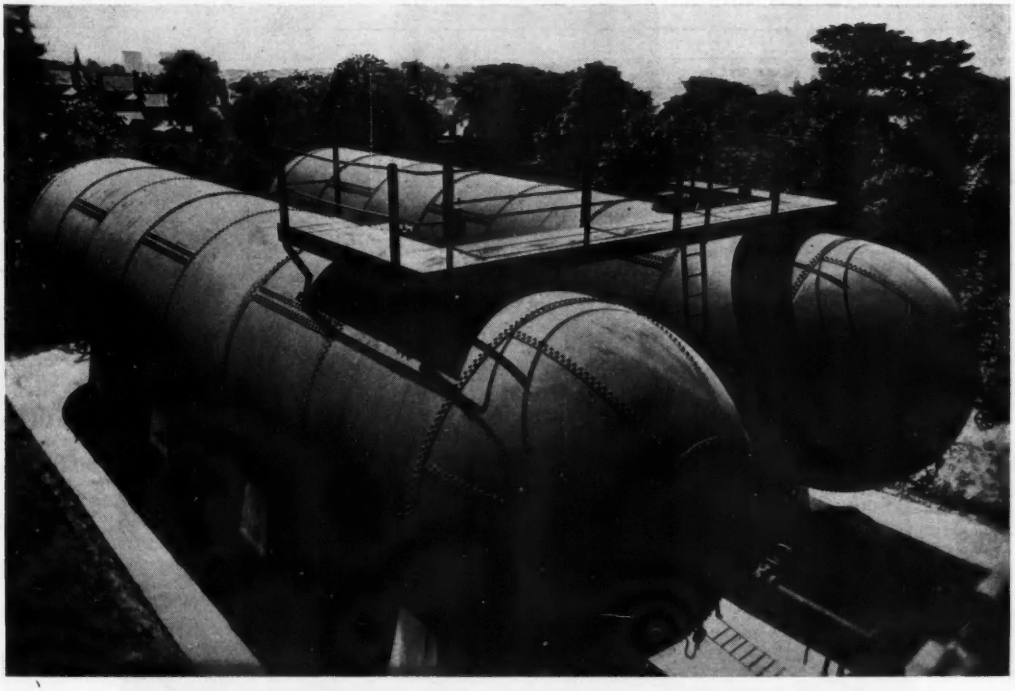

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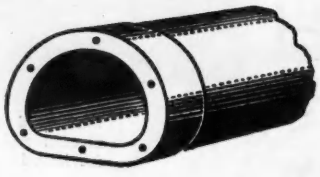

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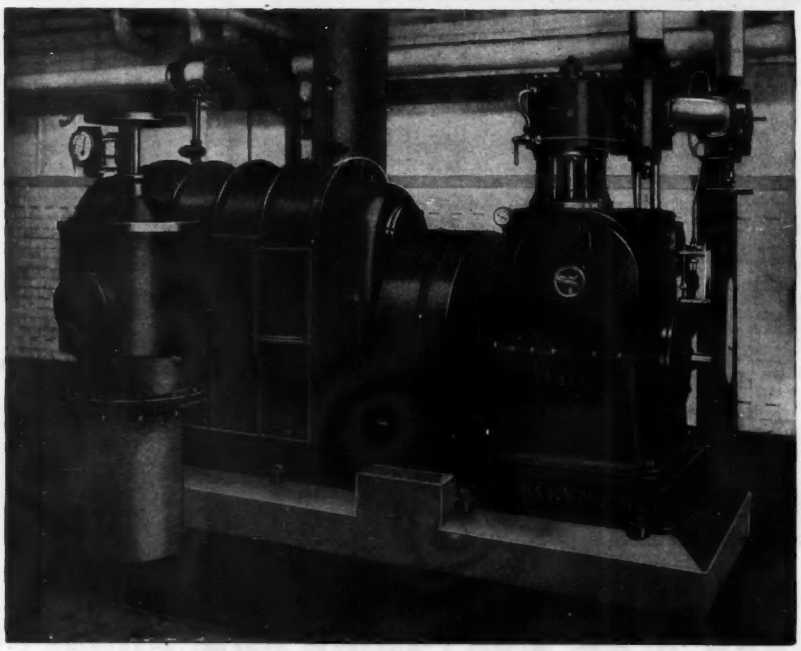

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FMF

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The lower photograph shows another operation in which the entire section is dipped in a bath of Fryolux, diluted with water. Fryolux has many applications in industry and Fry's Technical Department is maintained in order to advise on the best methods of using all solders and fluxes supplied by Fry's.

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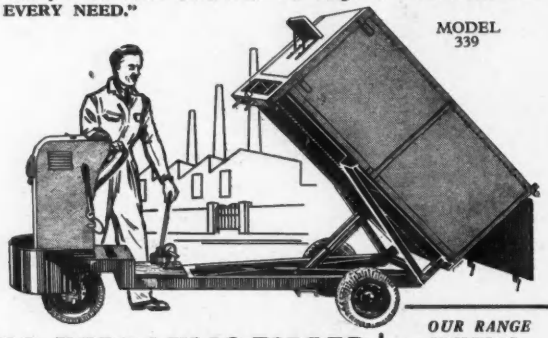
1 & 3 H.P. MOTOR TRUCKS THAT HAVE PROVED THEIR WORTH!

As a firm with a long standing reputation for first-class workmanship—we offer you this latest addition to our range of "TRUCKS FOR EVERY NEED."

MODEL 339



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WEST STREET • POOLE • DORSET.

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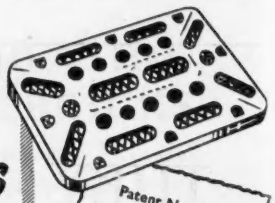

Patent No. 520940
This is Pattern No. 2550 M for use in Met. 1 and 2 and Cannon New Challenge

Available for all types of Gas Cookers

An ever increasing number of Gas Cooker Manufacturers are using Chrome Grill Deflectors. They give greater heat in a shorter time, and have a longer life than any others.

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MALLEABLE IRON PIPE FITTINGS & UNIONS

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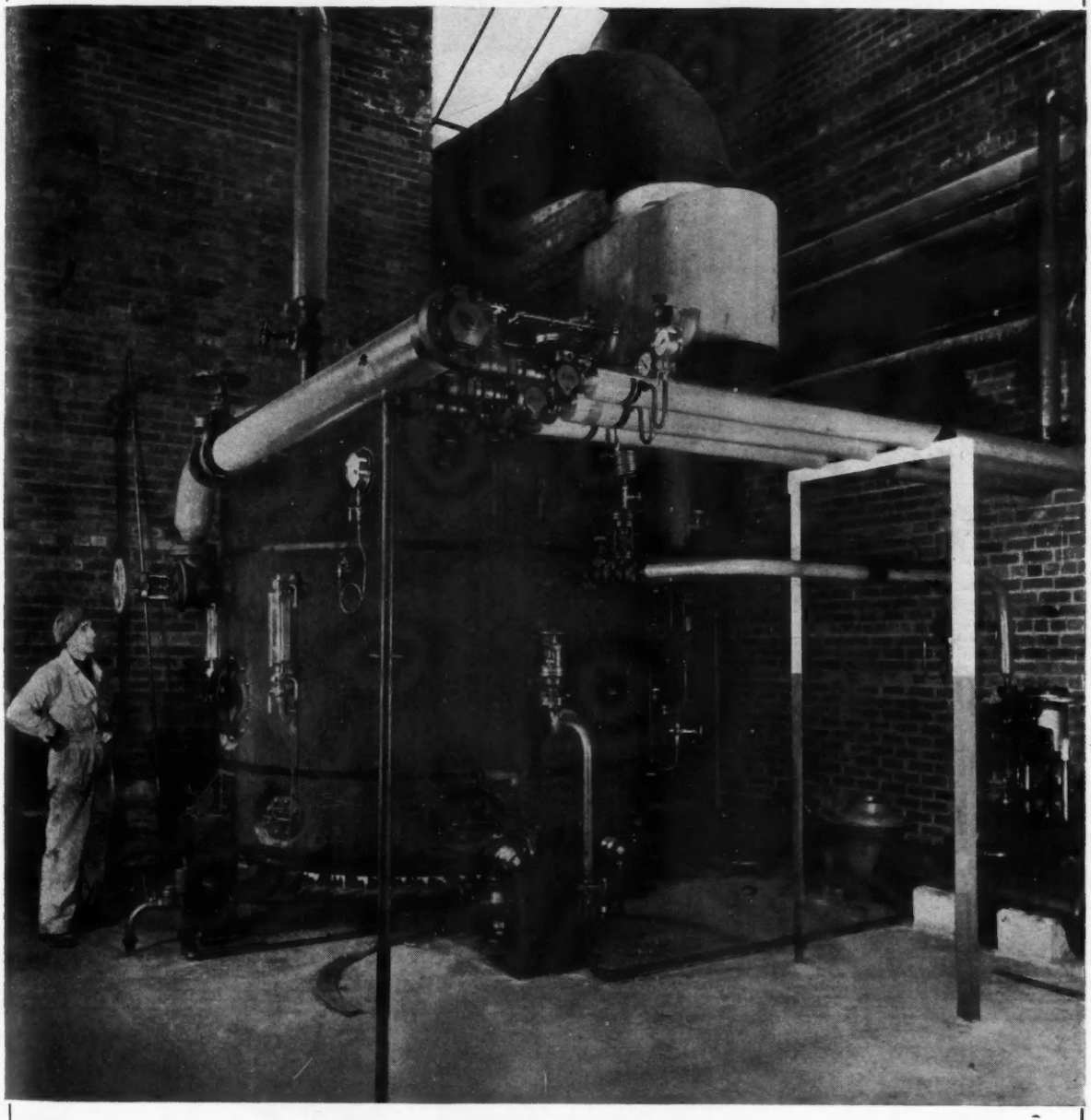

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Normal evaporation capacity 3,500 lbs of steam/hr. from cold feed.

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TAS/CH.410

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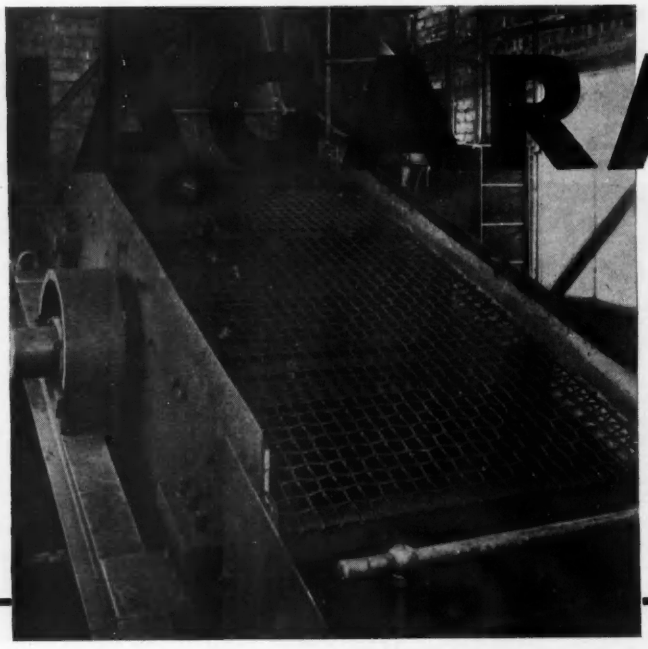

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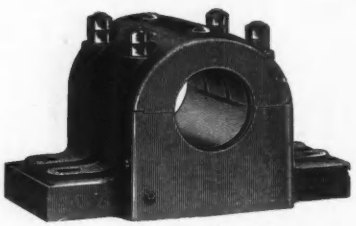

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USED BY LEADING ENGINEERS FOR COAL AND COKE HANDLING PLANTS
IRON CASTINGS AND MECHANICAL DEVICES FOR VARIOUS GAS PLANTS
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*Choice of Petrol or Diesel (Saurer Patents).

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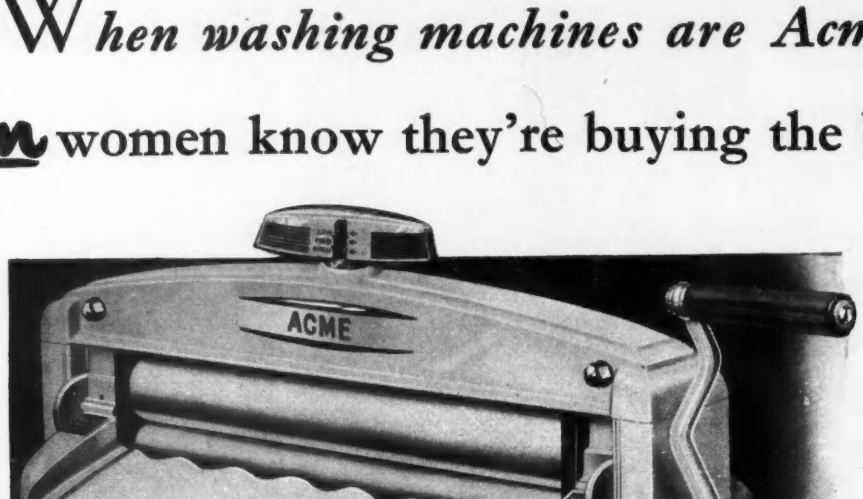
When washing machines are Acme-fitted **then** women know they're buying the best . . .



WOMEN are buyers of washing machines. Women are buyers of wringers. And when women think of wringers they think of the Acme. So when your machines are Acme-fitted your customers know that they must be, like the Acme, the best on the market.

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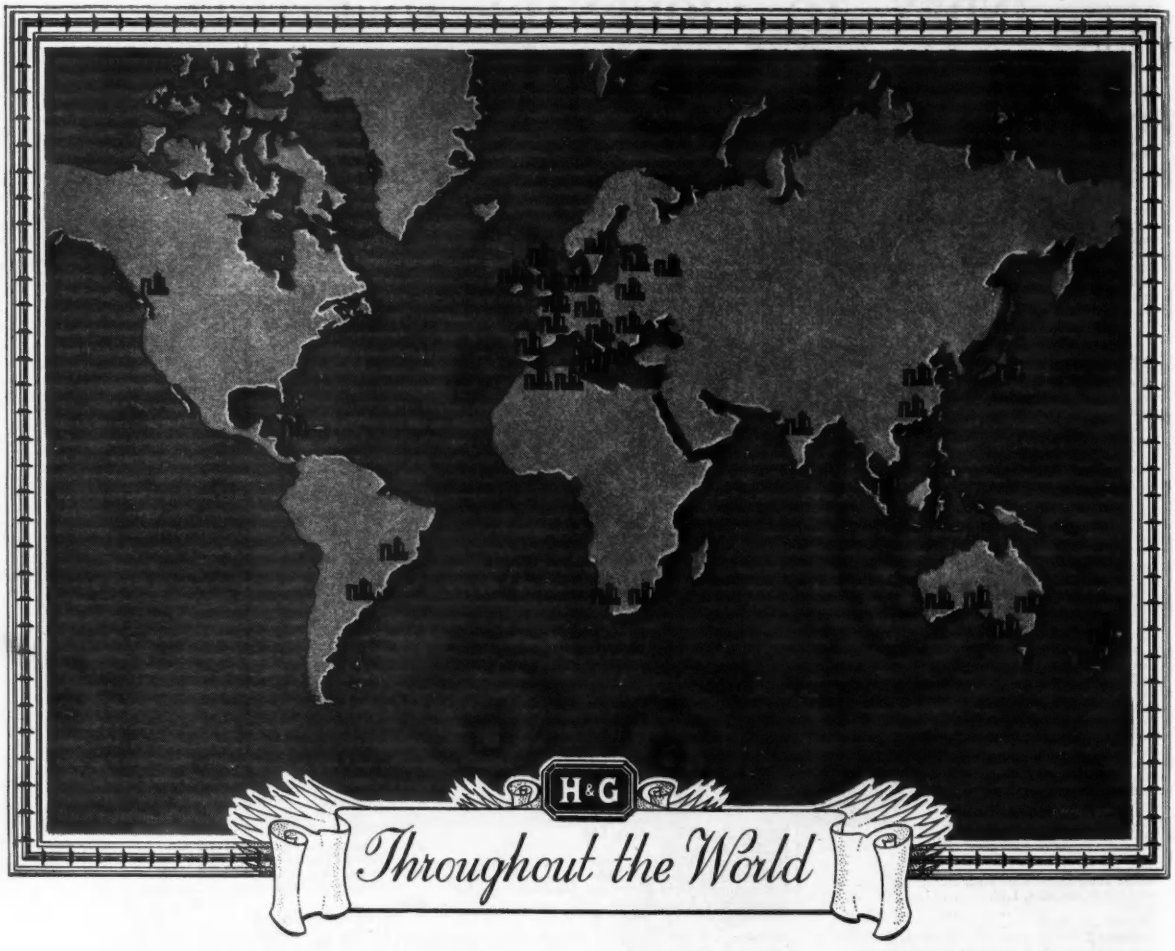

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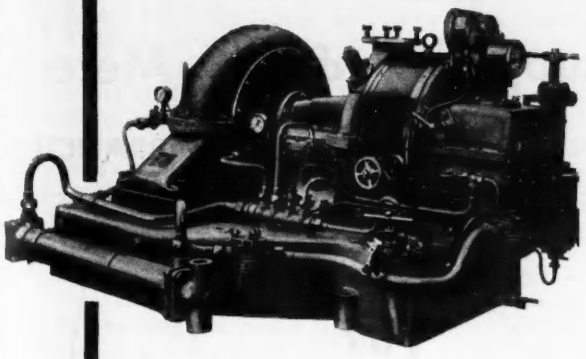

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GAS JOURNAL

VOL. 265. No. 4575 103RD YEAR FEBRUARY 7, 1951

ANOTHER OPERATION EFFLUENT

MR. PHILIP WEDGWOOD modestly suggests that his paper might provide the London and Southern Section of the Institution of Gas Engineers with one of its 'finest hours.' If it were not for the vivacity and enthusiasm which he put into his treatment of this subject, it might rather have been one of its longest hours. And one wonders whether a little less history and a little less law, with a pruning down of details to the essential, would not have made his paper a good deal more digestible. This was not so much verbosity as exuberance. And while it may be doubted whether he succeeded, as he intended, in producing a paper 'which will be read,' it was certainly not one which one wanted to skip, in case there *might* possibly be some gem hidden in all this matter. Perhaps there is.

The final picture which emerges is certainly not characterised by clarity or precision. Everything seems to be in doubt, except that, unless he 'watches out,' the unfortunate gas engineer may 'get it in the neck' for something of which he may not be guilty at all. The gasworks may be held responsible for water pollution when its effluent is discharged into the sewers if the real cause of the toxicity of the final effluent is defective sewage treatment. Yet effluents are lawfully discharged into the sewers if that is done with the consent of the local (sewage) authority.

The examples of pollution selected for examination in the paper are those of which the author has personal knowledge in the gas industry, 'because' (mercifully) 'a limit must be set to the scope of this communication.' And in nearly every case there is a big element of doubt. The presence of thiocyanate, of phenols and tar acids, is not peculiar to gasworks products. It seems to him that the only conclusive proof of liquor contamination would be the presence of tar bases which are more resistant to oxidation—for the detection and estimation of which there appears to be no good standard method.

Mr .Wedgwood repeats the now well-known principles upon which gasworks effluent should be pre-treated and passed to the sewage authorities. Surely the bed-rock principle is still that there should be constant liaison and co-operation between the two authorities so that it cannot be said that the one is unaware of what the other is doing and is proposing to do. It may not be without interest to the gas engineer to know what are the best temperature conditions in the filter beds and how these are best maintained, to know what are the most favourable rates of loading per cubic yard per day of filter material, and whether such material should be stone, clinker, coke, or broken brick—but we cannot see what business these high matters are of the gas engineer. The sewage engineer may tell him about them, but he cannot expect the gas engineer to relieve him of any responsibility for them. And whether we think the design of filters and methods of circulation are scientifically based or not, it is going a little wide of our duty to oppose our opinion to that of the skilled and experienced sewage engineer and biochemist in this thing.

When we get back to our own domain, we do not appear to have anything much, past our own Dr. Key. But even his recommendations can be distorted. Here is a passage in this paper. 'Where then does the alleged difficulty in treating spent gas liquor arise? It would appear that when the discharge is properly regulated there is no difficulty whatever. If it is discharged intermittently, as it is in some cases, I agree there may be trouble and to my mind this is a matter to which all gas engineers should give immediate attention.' Well, now, is not that what Dr. Key and his collaborators told us years ago? What is happening now, or what is about to happen now, is that the annual volume of gasworks effluent flowing to one local sewage treatment plant threatens to expand, in certain cases, beyond anything contemplated, say, 20 years ago. As long as the effluent was that of a works supplying gas to a population concentration roughly similar to that served by the sewage plant, it was manageable on the lines laid down above. But if you are going to build a very large gas-making plant in a particular locality (perhaps even one lightly populated) it is now recognised that a new situation has arisen which calls for new methods of approach. Mr. Wedgwood's contribution to this division of his subject is neither adequate nor constructive.

In fact, we do not know what he would have us do in these circumstances. It is possible that the effective methods and measures are not yet known.

Mr. Wedgwood has put a lot of work into the study of effluents, their cause and cure. He has certainly heard (perhaps a little invented) 'great argument about it and about.' Perhaps he will some day sit down and tell us —in as few words as will just suffice—what it is really all about and, most of all, what new methods can best be applied to new conditions in this field.

COAL STORES

IN his paper presented to the London Section of the Institute of Fuel, an abstract of which we published last week, Mr. L. G. Locket discussed the general principles of the storage of coal by large users, at a time when coal stores everywhere are getting pretty empty. But the principles remain, and they need to be kept well in mind when gasworks designs are on the drawing board. Mr. Locket's viewpoint was that of industry in general and apparently that of the distributor or middle-man in particular. We in the gas industry are not much concerned with the latter. His place has been fully taken by the coal officer of the area board who will make it his business to collect all the necessary information, if indeed it is not already within his experience, 'on the best sources of supply of fuel for his particular plant.' He will already have at his disposal a wide knowledge of the numerous types and sizes of coal produced at the multitude of collieries and pits situated throughout England, Scotland, and Wales. It is his duty to obtain for the undertakings owned by his area board the right coal at the right price and at the right time. Or, shall we say, that represents what he could do and would do if he were not thwarted and hampered on all sides by shortages and restrictions. His power (like that of the distributor of whom Mr. Locket speaks) to perform that duty has largely disappeared. That day has gone. Coal for the gas industry, at any rate, will be allocated and obtained by registration with the coal industry. Some day a national coal policy will emerge in which bituminous coals will be allocated to the carbonising industries and the area board coal officer will be able to get for his uses such coals as are available with properties suited to the several types of plant installed in his area.

Mr. Locket classifies coal storage under the neat headings 'tactical' and 'strategic' reserves. *King's Manual of Gas Manufacture* speaks of long-term storage of five to eight weeks' consumption to cover major interruptions of supply, and short-term storage of one to three weeks' consumption which may be looked upon as an extension of the storage within the retort house, serving to obviate the handling of wagons and other vehicles during the week-end or holidays, and covering minor interruptions of supply such as temporary breakdown of transport.

Long-term storage, the strategic reserve, is generally laid down in the open where, in normal times, it may lie for some years. Mr. Locket's treatment of the question of heating and fire risk in these large dumps is very good. One of his suggestions is particularly well worth noting. He suggests that a low wall should be built round the storage area (which, by the way, it is well worth while to pave with a substantial concrete floor) to exclude air from the base of the heap. He further suggests that the coal should be stocked to a height of 6 ft. and then well rolled down. His remarks on observation and control of heating are excellent.

But the gas engineer has another problem on his mind. That there is serious deterioration of the gas-making and coking properties of coal when it is kept for any length of time in stock, and particularly when it is stored in the open, is not in any doubt. There is some difficulty in coming by accurate data upon which a valuation of this deterioration can be traced. J. Jamieson and W. J. Skilling (I.G.E. Comm. No. 201) studied the effect of storage in the open for about 3½ years of a number of Scottish coals. The results were a little confused but it was clear that four out of six of these coals were seriously de-graded by exposure to weather. Even when coal is stored in large quantities under cover deterioration is not negligible. One observer, watching his stocks of South Yorkshire coals over many years, came to the conclusion that there was a fall in gas made per ton *at the same calorific value* (the only sound basis of comparison) of 5% after two years in stock. He noted that the deterioration slowed down considerably after the first two years and that it did not reach more than 10% after 10 years. He therefore made it a rule to renew his reserve (which might be called 'medium strategic' in his case) every two years. One would think that in view of the precarious future of coal supplies in this country the coal store of the future will be of medium tonnage, that it will be a distinctly paying proposition to keep it under cover, and that it will be well to see that it does not lie more than two or three years.

The problem whether coal should be handled in and out of store by mechanical means will thus tend to disappear, except in those cases where sea-borne supplies to works far from the coalfields will necessitate the perpetuation of the big open-air stock. There is everything to be said for the design of retort house machinery in such a manner that it can serve too for handling coal in and out of short-term stores built adjacent to the retort house—an example of which is given in *King's Manual*.

Mr. Locket also calls attention to the approaching standardisation of railway stock for the transport of coal. Designers will now be called upon to allow for, in tippers and coal-receiving plant, the new 16-ton fire-door all-steel wagon. It is a pity that the new standard wagon, like most of its predecessors, has only one end door. The end-tipper is often the most convenient method of discharge and with one end door, two tippers are required, with the very inconvenient alternative of a turn-table. The gas industry could more conveniently have dispensed with one of the two bottom doors through which the contents can never be completely discharged without handling.

Arrangements will continue to be made, particularly in or near the coalfields, for road-borne traffic, though generally one would think it is time that this heavy commodity was kept off the roads. Canal and sea-borne transport present their own problems of handling and storing, problems which need specialised study in each individual case.

Letter to the Editor

VERBOSITY

DEAR SIR,—Thank you, Oh thank you, for your leading article on January 17. At long last someone has put into words—and such good robust words—what so many of us have thought about verbosity. It is surely the only commodity available today in abundance, and from what mean little facts does it too often so prolifically grow!

On rare occasions there is justification for a full scale review of existing knowledge or practice with perhaps the painting in of the historical background. But usually it is some new theory, fact, or technique that merits publication. The new knowledge is almost invariably small and circumscribed and it can be presented in few words.

In subjecting his findings to the test of discussion surely the author hopes for criticism of his work and guidance as to its application. He can best obtain both if his audience is told only what he has done, and is given (and gives itself) time to express its views. The free play of discussion by those competent to discuss is vital to the future of science and to the proper use of the findings of science.

Might I suggest that budding authors should study Hansard to learn how the tiniest idea can lead author and audience to an unbelievable output of words and too often to the complete obscuring of any inert in the idea itself? Might I suggest as models of excellence the many introductions by Professor Cobb to Leeds research reports; the almost stark economy of words in papers from the Fulham laboratories of the old Gas Light and Coke Company; and the few lines in letters to *Nature* sometimes announcing findings of world importance?

Yours faithfully,
A. G. GRANT.

Darlington.
February 5, 1951.

Personal

Mr. A. F. J. Abley, Distribution Superintendent at Consett (Northern Gas Board), has been appointed Installations Officer with the North Western Gas Board at Preston.

◇ ◇ ◇

Mr. H. E. Poyser has been appointed to the new post of General Manager of the Potterton Gas Division of Thomas De La Rue and Co., Ltd. He was previously Sales Manager of the Division. **Mr. Ernest Brooks** (Works Manager) has succeeded Mr. Poyser as Sales Manager and **Mr. J. R. Knott** (Sales Manager, Midlands area) has been appointed Divisional Works Manager. **Mr. J. E. Cooper,** formerly Technical Manager, is now Research and Development Manager of the Division.

◇ ◇ ◇

Mr. E. T. Sevenoaks has retired from the North Thames Gas Board after 41 years' service with the gas industry in the Harrow area. He started as a clerk in 1909 with the old Harrow and Stanmore Gas Company. In 1924 the Company amalgamated with the Brentford Gas Company, then two years later came the amalgamation with the Gas Light and Coke Company. Mr. Sevenoaks saw service in France during the 1914-18 war, and in 1919 when he returned he seized the chance of continuing an open-air life and became a collector with the Gas Company. He carried on with this type of work until just before his retirement. He has been presented with an inscribed gold watch by Mr. Michael Milne-Watson, Chairman of the Board.

◇ ◇ ◇

Mr. E. Johnson, for many years associated with the Norwest Construction Co., Ltd., has been appointed Managing Director of the United Kingdom Construction and Engineering Co., Ltd. (We have already reported that Colonel W. Moncrieff Carr, who resigned when he became Chairman of the North Western Gas Board, has been re-elected a Director and re-appointed Chairman of the Company, following his retirement from the Gas Board.) The Company has established new offices and workshops at Hammond Road, Kirkby Industrial Estate, near Liverpool. (Telephone: Simonswood 2601.) The premises previously occupied at Ashton-under-Lyne have been vacated and a Manchester office has been established at Lloyds House, 22, Lloyd Street, Manchester, 2. (Telephone: Blackfriars 8076.)

Mr. A. H. Copping, who has represented Bratt Colbran, Ltd., in the Northern and Eastern areas for many years, is recovering from his recent operation. Mr. Copping will, unfortunately, be unable to resume his business activities for some two or three months.

◇ ◇ ◇

WEST MIDLANDS APPOINTMENTS

The West Midlands Gas Board announces the following appointments:

Dr. J. Gregory, M.B., CH.B., D.I.H. (formerly of the Ministry of Supply, Atomic Energy Division, Preston) to be Assistant Medical Officer, Board headquarters. P. C. Billings, A.C.A. (Cradley Heath & Halesowen) to be Senior Accountant, Board headquarters. J. K. Barnett (Editor, Area Board Magazine) to be Assistant Personnel and Establishment Officer. W. N. Marshall, M.C., Civil Defence Officer. R. D. Cooper, Statistics Officer. L. T. J. Hands, Publicity Assistant. T. E. Gotham, Deputy Divisional Accountant, North Staffs Division. I. Greenwood (Stoke-on-Trent), Divisional Sales and Service Officer, North Staffs Division. C. E. Williams (Dudley), Divisional Sales and Service Officer, Wolverhampton Division. A. W. Cullington (Smethwick Group), Divisional Sales and Service Officer, Walsall Division. N. J. Wilson (Malvern), Divisional Sales and Service Officer, Worcestershire Division. D. W. Mills, Chief Administrative Assistant, Birmingham District. F. A. Grant, Superintendent of branch office and showroom, Kings Norton. A. S. Brown, Second Administrative Assistant, Birmingham District. H. W. Cusworth, Senior Engineering Draughtsman, Coventry District. N. Heap, Fittings Superintendent, Coventry District.

Obituary

HENRY JAMES HODSMAN

The news of the sudden death of Henry James Hodsman at the age of 64 will be received with the deepest regret by his many friends in Yorkshire and in the University of Leeds. He was one of the most senior members of the University, having joined the staff of the Department of Coal Gas and Fuel Industries in 1912 shortly after the appointment of the late J. W. Cobb as Livesey Professor.

Educated at Archbishop Holgate's Grammar School, York, Mr. Hodsman graduated in the University of Leeds in 1906; in 1907, after taking his M.Sc. degree, he was awarded an 1851 Exhibition for a study of applied chemistry at the Technische Hochschule, Karlsruhe, and later at the Sorbonne, in Paris. On his return to this country he spent some time in the chemical industry; he then joined the University staff and eventually became Senior Lecturer in Gas Chemistry.

He was one of the first to apply fundamental scientific principles to the technology of fuel, then in its infancy. His long and happy collaboration with Professor Cobb laid the foundation of the flourishing University Department of Fuel and resulted in outstanding contributions to the science of this subject. His special interests were in the manufacture of gas and in the coke and tar by-products, and for his services to the gas industry he was elected to Honorary Membership of the Institution of Gas Engineers. During the first World War, again with Professor Cobb, he acted as Inspector of Explosives, and his sterling services were recognised by the award of the M.B.E.

Mr. Hodsman was closely connected with the cultural and educational life of the county and he served for a long period as Governor of the Morley grouped secondary schools. He was a member of many societies, notably the Society of Chemical Industry, of which he had been a member of the Committee of the Yorkshire Section since 1921, Chairman in 1927-29, and Honorary Secretary and Treasurer since 1931.

As a member of the University of 40 years standing he was guide, tutor, and friend to many generations of students by whom he will be remembered with esteem and affection.

He leaves a widow and two sons.

Dr. A. C. MONKHOUSE writes:—

My first association with Hodsman was in World War I, when, as a callow student, I helped for a period in the war work at the Fuel Department, Leeds, on toluene recovery from tar and benzole. Later I became a research student in his Department and was in close association with him for many years.

He was a man of encyclopædic knowledge of fuel, who

realised it was essential that a student should be well grounded in the fundamental knowledge of his subject, and that this was the proper basis on which his practical experience should be built. He was in close touch with the fuel industries of Yorkshire, and was often consulted on many problems.

His great work was with the students who passed through his hands. They were no mere heads into which knowledge had to be instilled, but individuals whose personality had to be developed. He never forgot his student days in England, Germany, and France, and for that reason could always appreciate the point of view of youth. He had a fund of stories of his old students; his eyes would sparkle and his laughter be uncontrolled as he recounted one of their adventures in the laboratory due to excessive zeal, or their doings in examinations or at works.

Character and personality in students interested him as much as brains. Students far and wide will look back to their days in the Fuel Department and give thanks to 'Hoddy' for his kindliness and sympathy in their formative years.

Dr. STUART PEXTON writes:—

H. J. Hodsman's sudden death, on the eve of retirement from his life-long Lectureship of Fuel Technology at Leeds University, will be felt as a personal loss by the large number of his old students everywhere. When Mr. Hodsman was invited by Professor Cobb to join the staff of the Fuel Department in 1912 he had, after graduating at Leeds, studied with an 1851 Exhibition with Professor Haber at Karlsruhe and with Professor le Chatelier in Paris. He thus brought to his new tasks a somewhat unique academic experience. Throughout his long career at Leeds, Mr. Hodsman endeared himself to successive generations of students with whom he maintained the closest interest. He organised the laboratory courses in fuel chemistry and his patience, humour, and knowledge made him an ideal tutor. He maintained throughout a keen interest in researches on coke, tar, and purification and was an active supporter of the Yorkshire Section of the Society of Chemical Industry with which he visited the United States in 1928. After the first World War he was honoured with the M.B.E. for work with the Directorate of Explosives Supplies.

We extend to Mrs. Hodsman and her two sons our deepest sympathy.

Mr. S. G. WATSON writes:—

The passing of Henry James Hodsman has been to me, as to many others, a profound and bitter shock. To him I owe very much indeed and I take up the writing of this humble note with a feeling of sadness and loss. How much more would I have wished to carry out my original intention of expressing, with others, my appreciation and esteem at a small gathering planned to mark his forthcoming retirement from professional duties!

His sound technical knowledge and his work for, and at, the University of Leeds are known to all, and his contributions to the fuel and gas industries are recorded by papers and discussions which appeared at regular intervals. There are, however, a few of us, unfortunately now limited in number, who were privileged to enjoy a more intimate side of his character —namely, that of our tutor and director of studies at Leeds University.

After the first World War there assembled at Leeds groups of students, some straight from their schools, but mostly men from the various Services, with grants for education from the Government. To me, and I believe I speak for others, the prospect of three or more years of study and routine did not appear attractive after the relative freedom of Service life. It will be readily understood how surprised we were to find the approach from our tutor was that of already an old friend, who suggested it would be advisable to buy certain books, attend certain lectures, and put in some time in the laboratory. No issuing of orders, but a request as one man to another.

We perhaps doubted our futures, but the method produced results, and out of it came, not H. J. Hodsman, but 'Hoddy' as he will always remain to us.

That was the demonstration of our friend as the subtle educationalist and sound psychologist he was. His method was soundness applied with gentility and tact, but knowing precisely what he wanted from us and getting it with a minimum of clamour and fuss.

He was not a father to us, but an elder brother, helping a younger and favourite brother with his work. Yet inside his calm exterior burnt the fire of a fervent seeker for the truth.

How many times after we had reported our conclusions to him was it suggested to us that we go back to the laboratory bench and 'prove the matter beyond a peradventure'?

It was my privilege to work with him personally for 18 months on a research through laboratory to works scale, and his careful and precise methods of collecting and applying detail were very inspiring.

He appreciated greatly also the social side of the University, both formal and informal, and I think the latter brought back memories of his own student days at Karlsruhe.

There is little more I can say.

Typically, 'Hoddy' has calmly and unobtrusively stolen away from our company, and quietly closed the door.

Mr. A. G. GRANT writes:—

The opening lines of a long narrative poem recited at Fuel Department dinners in the middle 20's reflect the respectful affection his students felt for H. J. Hodsman.

> 'I've smashed the Bone and Wheeler;
> Oh, what will Hoddy say?'

What 'Hoddy' said, what he often refrained from saying, and his quiet presence always among us in the Department—these to many of us constituted the most vital and enduring influence in our University careers. Twenty-five years later at a crowded meeting or reception one has thought 'There's Hoddy. I wonder what he says about it'—'it' being the soundness of a paper, a point of view, a salary problem, or a political issue, and what he said would always illuminate the problem by its clarity and reasonableness. It is because of this affectionate respect he inspired in us that we are so grieved and saddened by his too early death.

As a lecturer and in conversation he was uninspiring; his eyes roamed outer space and his too quiet and measured voice was directed at his own waistcoat. Yet, when the lecture notes or his advice were restudied there emerged a disciplined development of the subject, an appeal to principles, a disdain for mind-clogging data, and a stimulus to turn to original sources. Indeed, his amazing ability to direct one's attention to work reported in journals of a dozen countries engendered an international view of science that has become part of the Fuel Department tradition; to him the important boundary was not between countries, but between the sincere and the charlatan.

As one got to know 'Hoddy' as the familiar spirit of the laboratories, and as a mentor and supporter in the ordeals of preparing and delivering papers at the fortnightly 'colloquia,' one found wisdom, incisively clear thinking, scholarship, and, above all, kindliness. No don of fiction was ever more shy and self effacing; none more disconcertingly aware of what was going on around him. One was hard up, had acted the goat, was perplexed whether or not to accept a proffered office in the Union—a talk with him brought not so much advice as a far more valuable appraisement of the situation and one's duties. He was so reasonable, and daylight suddenly appeared. He knew so surprisingly much about each of us and about students as a whole. He had worked at Karlsruhe under Bunte and was a friend of Haber to the end; he had been a ski-er of some prowess; he had nightly surveyed the world from the pinnacle of Leeds Town Hall on some duty or other in World War I—and one sensed, above all things, an absence of parochialism in this retiring personality. Among the many surprises was his grasp of finance appearing, for example, in advice that one should study the accounts behind the promoting of an invention that had caught one's fancy.

He was always attached to his old students, and took pride in their success; at Institution meetings he used fondly to count those who were prominent. A few years ago it was a privilege for a few of them to pave the way to his election to Honorary Membership. He valued this highly, but the industry will remain in his debt and—through his old students —under the influence of his teaching and example. He and Professor Cobb, in close accord but in different ways, inculcated standards of thought, work, and presentation that the gas industry must preserve and cherish; their basis was truth and reasonableness. The industry will depart from them at its peril.

I should not like these pages to go to press without a tribute from myself to Henry James Hodsman. Others who were more closely associated with him have written a few of their thoughts about him. Hodsman—and I think that those who were with me at Leeds in the carefree years after World War I

will agree—had an elusive personality. I feel sure that the young veterans of that war could not follow his lectures with any degree of clarity, but I am equally sure that in 'Hoddy' they found a friend and a tutor. 'Hoddy' hated self-inflation and he could perceive without malice the false and true among the dissertations of the many students of different races who owe to him a debt which they can pay only by stark sincerity. —NORMAN SMITH.

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We regret that in our report last week of the death of **Lady Elizabeth Bell,** widow of Sir John Ferguson Bell, the name was incorrectly printed as Lady Ball.

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The death is announced of **Mr. Harold Baker,** aged 83, who entered the gas industry as a young man. He became Engineer and Secretary at Cockermouth in 1898, and in 1902 he went to High Wycombe to take a similar position with the High Wycombe Company. He held that office until 1921, when the Company was taken over by the Uxbridge Gas Company. Mr. Baker became gas examiner to the High Wycombe Corporation, and held that office for 25 years until 1946. He was also for many years Consulting Engineer to the former Beconsfield Gas Company until its amalgamation with another undertaking, and served the Thame Gas Company in a similar capacity for 30 years, until its absorption in the Oxford Company a few years before the last war.

Diary

Feb. 9.—Institute of Fuel: Brains Trust, 'Coal Preparation, Marketing, Distribution, and Use,' G. S. Jenkins, J. W. Anderson, and H. E. Partridge, Robert Gordon College, Aberdeen.

Feb. 9.—London and Southern Junior Gas Association: 'Education and Training in the Gas Industry,' W. F. Pritchard (Tottenham Division, Eastern Gas Board), 178, Edgware Road, W.2, 6.30 p.m.

Feb. 12.—Royal Society of Arts: Cantor Lecture on 'Training in Industry,' by A. G. Beverstock and F. H. Perkins, John Adam Street, Adelphi, W.C.2, 6 p.m.

Feb. 13.—Institution of Heating and Ventilating Engineers: 'Town Gas and the Heating Engineer,' T. H. Pardoe, R.W.A. School of Architecture, Bristol, 6.30 p.m.

Feb. 13.—Midland Junior Gas Association: 'Outstanding Developments in Ferro-Concrete Construction,' J. A. Milner, Staff Mess Room, West Midlands Gas Board, Birmingham.

Feb. 14.—Institution of Heating and Ventilating Engineers: 'Space Heating,' P. H. Hollingworth, Radiant House, Liverpool, 6.30 p.m.

Feb. 14.—Western Junior Gas Association: Visit to the works of J. W. Singer & Sons, Ltd., Frome, 2.15 p.m.

Feb. 14.—Institution of Gas Engineers (South Western Section): 'Gas Measurement by the Dry Meter,' Stanley Armitage, Taunton, 11 a.m.

Feb. 15.—Wales and Monmouthshire Junior Gas Association: Inspection of Power Gas Corporation carburetted water gas plant, Treforest gasworks, Pontypridd, 2.15 p.m. 'Observations on Starting Up a New Automatic Carburetted Water Gas Plant,' C. Evans; 'Prime Movers for Compressors,' J. D. Pickard (Wales Gas Board); 'Aspects of High Pressure Storage,' J. Day, B.SC. (Newport).

Feb. 16.—Junior Institution of Engineers: 'Modern Practice in the Manufacture of Town Gas,' L. J. Clark, 39, Victoria Street, S.W.1, 6.30 p.m.

Feb. 17.—Scottish Junior Gas Association (Western District): Afternoon visit to the cement works of the Coltness Iron Co., Newmains, Wishaw.

It is regretted that in our report of the discussion on Mr. H. Bromley's paper, 'Domestic v. Industrial Cost per Therm,' to the London and Southern Section of the Institution of Gas Engineers (p. 48 of the *Journal* for January 3) the remarks of Mr. W. Johnson, of the Special Service Department of the South Eastern Gas Board, were attributed to Mr. W. T. Houston.

1951 'Journal' Directory

A fortnight ago, in introducing the 1951 edition of the *Gas Journal Calendar and Directory,* then on its way to subscribers, we acknowledged with gratitude the co-operation of all who had helped to bring the information up to date, and bespoke further help from readers in keeping us posted with news of changes as they occur. We are glad to include in our first monthly list of revisions a number of items which would not have come to our notice without such co-operation. We invite users of the *Directory* to note the following changes (together with the appropriate adjustments relating thereto in the 'Personnel' section, pp. 137-152):

Page 21.—EAST MIDLANDS GAS CONSULTATIVE COUNCIL: Add Councillor G. H. Clarke (Wolverton), Councillor F. Perry (Moorends, Doncaster), R. Unwin, J.P. (Ashbourne), *members.* Delete E. Lester (Loughborough), deceased.

„ 21.—EASTERN GAS CONSULTATIVE COUNCIL: Add L. J. W. Barker (Huntingdon), *member.*

„ 21.—NORTH THAMES GAS CONSULTATIVE COUNCIL: Add Councillor A. W. Arthurton (Burnham), Councillor W. R. Cowen (Kenton), Councillor H. Olding (Slough), and Councillor J. W. Perotti (Fulham), *members.*

„ 22.—NORTHERN GAS CONSULTATIVE COUNCIL: Add Mrs. R. A. Dixon (Newcastle) and Alderman E. Johnston (Sunderland), *members.*

„ 22.—SOUTH EASTERN GAS CONSULTATIVE COUNCIL: Add Alderman R. Farrell, F.A.C.C.A. (Worthing), Alderman J. A. Larby (West Ewell), *members.*

„ 22.—SOUTH WESTERN GAS CONSULTATIVE COUNCIL: Add E. W. Fry (Bampton), *member.*

„ 23.—SOUTHERN GAS CONSULTATIVE COUNCIL: Add A. A. Jacques (Southampton), S. E. Vincent (Andover), *members.*

„ 23.—WEST MIDLANDS GAS CONSULTATIVE COUNCIL: Delete Alderman C. J. Marchant, *member* (resigned).

„ 27, 32, 33.—LINCOLNSHIRE: Head Office, Belle Vue House, Lincoln. (The following changes take effect from April 1): *Divisional General Manager:* B. Clarke; *Deputy Divisional General Manager:* J. S. Marshall; *Divisional Engineer:* D. W. Ault. The three sub-divisions shown on pp. 32 and 33 are merged into the Lincolnshire Division, which will subsequently be divided into groups or districts. Delete Colonel J. Kennington, *Sub-Divisional Manager,* and *Manager,* Barrow-on-Humber, Cleethorpes, and Grimsby (retiring March 31).

„ 29.—LONG EATON: M. E. Frost, *E & M.*

„ 35 and 38.—IPSWICH DIVISION: *Address:* Crane Hill Lodge, London Road, Ipswich. T/N 55425-6.

„ 54.—NORTH THAMES: Delete North Middlesex District.

„ 55.—MILL HILL: K. C. Mead, *Station Engineer,* vice F. Dawson, formerly *Manager,* North Middlesex District.

„ 55.—HARROW: F. Dawson, *Station Engineer,* vice L. Lacey, retired.

„ 71.—KESWICK: J. R. Clark, *M,* vice H. M. Tysoe, retired.

„ 78.—EDENBRIDGE AND WESTERHAM, Kent Suburban transferred, to Tunbridge Wells Group, Kent County Division, p. 80.

„ 86.—WESTON - SUPER - MARE SUB-DIVISION: *Address:* 'Kingsholme,' Arundel Road, Weston-super-Mare. T/N 4063-4-5. *Accountant:* A. L. Nicholls (not L. A. Nicholls).

„ 88.—PLYMOUTH AND NORTH CORNWALL SUB-DIVISION: *Production Engineer:* A. P. Jennings.

„ 103.—BEDWELLTY and MYNYDDISLWYN: Now combined and known as Blackwood and District. T/N Blackwood 2170. Make: 122 bt. Consumers: 4,423.

„ 105.—AMMANFORD: Delete D. W. F. Thomas, *E & M.*

„ 108.—LLANDUDNO: H. Allerton, *E & M.*

„ 109.—LLANGOLLEN: Delete E. P. Jones, *E &M.*

„ 111.—WEST MIDLANDS GAS BOARD: Delete G. A. Matthews, J.P., *Deputy Chairman.*

„ 123.—BUCKIE: A. R. Briggs, *E & M.*

„ 125.—HAMILTON: Delete J. B. Ferns, *E & M* (deceased).

„ 127.—STEVENSTON: T. McCartney, *E & M,* vice W. W. Mann.

„ 129.—MUIRKIRK: Delete T. McCartney, *E & M.*

THAT LAMP AGAIN!

The close concern of fuel technologists in waste heat recovery finds an echo in the naughty 'nineties in an early form of street lamp which, more versatile than its single-purpose counterpart to-day, combined with its more normal function the purveying of hot water and light refreshments. Recent references in the Press, including our own note in last week's *Journal*, seem to have aroused so much interest that we are prompted to delve further into the history of this remarkable invention.

CREDIT for this invention goes to a London solicitor, one Hugh Mansfield Robinson, LL.D., whose patent specification entitled 'Improvements in Apparatus for Supplying Hot Water by Utilising the Waste Heat of Illuminating Burners or Lamps' was accepted on July 11, 1896. The lamp was produced by a firm which went by the name of the Pluto Hot Water Syndicate, Ltd., whose telegraphic address, was, perhaps aptly, 'SCALDING, LONDON.' The registered trade mark took the form of an horrific satyr-heated serpent rising Phœnix-like from a bed of flames and spouting water from his mouth—the head of which appeared on the pedestal of the lamp, the mouth serving as the hot water outlet. The apparatus was patented 'in Great Britain and throughout the civilised world,' and was awarded a silver medal at the East London Diamond Jubilee Exhibition at the People's Palace, Mile End Road, in 1897-98.

Technical details of the water heating system were given briefly in the *Journal* last week, since when we have had the opportunity of studying the original patent specification in which the inventor starts off by observing that 'in carrying out my invention I arrange around the lamp post (and by preference around the lamp post known as Webb's Sewer Gas Extractor and Destructor, Patent No. 8193 of 1894) a casing in which are located a cold water supply tank and a hot water cistern.' A small quantity of water was carried through a spiral pipe above the lamp flame and then into a little boiler right at the top which turned it into highly heated steam. This steam, passing down again, boiled the water in a separate tank before passing back to preheat the large tank. When the halfpenny was inserted and the handle pulled, a quart of boiling water was emptied into the 'customer's' container, the return of the handle to its original position causing the small tank to be re-filled from the large one. The superheated steam brought the water to boiling point in a matter of three minutes. In the event of long intervals between drawing off, a safety-valve blew off the excess steam.

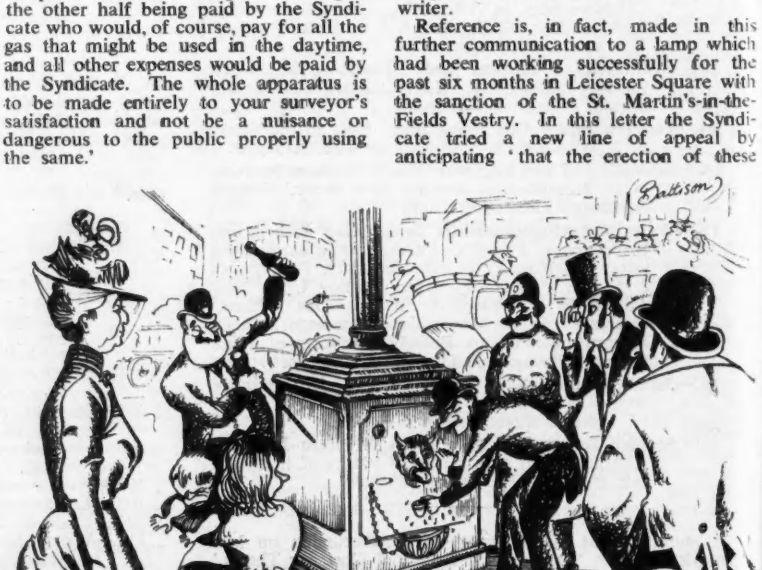
We are indebted to Mr. J. G. Aitken, Divisional General Manager of the Carlisle Division, Northern Gas Board, for a sight of the patent specification together with the maker's publicity leaflets and some most interesting correspondence addressed to the Carlisle Gas and Water Committee in October, 1897, and again in January, 1899, setting forth the advantages of the lamp and asking for it to be given a trial. In the first letter a rather staggering claim is made that 'the illuminating power of the gas is in fact increased.'

The Syndicate offered to erect and keep in working order at their own expense such a number of 'apparati' in connection with street lamps as might be required in suitable positions to be arranged with the surveyor. Each 'apparati' would be heated by at least four gas burners. 'In consideration of the licence to use the lamps, the Corporation would be asked only to pay half the cost of gas used in the lamp at night during the ordinary hours of illumination and at the same rate as other lamps in Carlisle burning the same gas, the other half being paid by the Syndicate who would, of course, pay for all the gas that might be used in the daytime, and all other expenses would be paid by the Syndicate. The whole apparatus is to be made entirely to your surveyor's satisfaction and not be a nuisance or dangerous to the public properly using the same.'

It was also pointed out that in the summer time the boon to artisans having only one living room of obtaining hot water without having to light a fire and render such room almost uninhabitable would be very great. The letter further observed that the apparatus was also very useful on cab ranks.

The foregoing was written in the beautiful copperplate style common in business correspondence in those days; and while a second approach some 15 months later, couched in even more seductive terms, suggest that the Syndicate's initial offer was not taken up by the burgesses of Carlisle, the firm must have achieved some success elsewhere if any inference can be drawn from the fact that by the time it made its second approach it had bought or obtained the use of a typewriter.

Reference is, in fact, made in this further communication to a lamp which had been working successfully for the past six months in Leicester Square with the sanction of the St. Martin's-in-the-Fields Vestry. In this letter the Syndicate tried a new line of appeal by anticipating 'that the erection of these



temperance lamp posts will have a beneficent effect in lowering the sale of intoxicating liquors by placing within the reach of the poorest a cup of a most nutritious beverage obtainable instantly at any time day or night.' The writer went on to say that many corporations and towns had granted permission for these lamps to be erected within their jurisdiction, and mentioned that 'as you will easily understand the profits from the sale of hot drinks being very small, we utilise the blank sides of the apparatus for the purpose of delivering the usual automatically supplied sweetmeats all of which are manufactured by firms of world-wide reputation for the purity of their manufacture.'

The foregoing having whetted our appetites for research into the past—a past-time usually indulged in only when we are exceptionally short of 'copy'—we came upon several references in back pages of the *Journal of Gas Lighting and Water Supply, etc.* (our then title) which the critical reader will consider we should have discovered before bursting into print on the subject last week.

In the issue of September 21, 1897, a full column was devoted to the 'Pluto' lamp with an enormous illustration and much technical data, and a claim by the makers that if all the heat then wasted from only one-tenth of London's street lamps were utilised in their system a total of 120 million gallons of boiling water per annum could be supplied through a slot machine. So optimistic were they that they apparently never doubted that Londoners wanted 120 million gallons of boiling water through a slot machine. In addition to the Leicester Square installation, the authorities at Liverpool and Nottingham had granted licences for the erection of the 'apparatus' in consideration of having half the gas bill for the street lamps paid by the Syndicate. At that time the lamp on view at the Crystal Palace had been in constant use for three months without needing any repair or regulation, and as many as 125 halfpennies had been taken in one day 'from stall assistants and inquiring visitors.'

By a curious coincidence this information was printed on a page opposite which was published the annual report of the Carlisle Corporation Gas and Water Department; but evidently that august authority had not yet joined the ranks of the 'converted,' for there was no mention of 'Pluto' in their report.

An Inauguration Ceremony

The official inauguration of the Leicester Square installation was attended by some ceremony, and although it was not marked by the breaking of a bottle of hot cocoa on the lamp, 'the simple function drew together a crowd of people whose appearances were as diversified as the criticisms they passed on the substantial and useful structure around which they were assembled.' (We must remember that last quote; it may come in handy as an opening for the next big inauguration of new gasworks plant.)

In those days we had our own correspondent in Scotland, who commented that the first town north of the border he had heard of to adopt the 'Pluto' system was Dumfries, where two lamps were authorised. They are a careful race, the Scots, for they recommended a notice on the lamp intimating that it was *hot* water which was supplied; otherwise people might get their mouths scalded if they applied them, as is sometimes done by workpeople when taking a drink at a public well. It seems surprising, on the other hand, that there should be thought to be any danger of the same careful race expending a ½d. to get a mouthful of *cold* water. Our correspondent felt that the delivery pipe should be placed where no one could get his mouth to it—which would set the designers a very pretty little problem if the pipe is at the same time to be within reach of the customer's container, allowing for all sizes of customer.

There was another risk which worried our conscientious correspondent—by now doubtless resigned to the fact that nothing he could say was likely to bring advertisement revenue from the makers. Children might get scalded from mischievously working the lamps. This, he observed, would point to the necessity for having such appliances under the control of some person, such as a shopkeeper. But then, as he ingenuously points out, the merit of the invention would not be so great, for any shopkeeper could sell hot water, if there were a demand for it, without the intervention of an automatic machine.

Our then Editor, too, was obviously sceptical about the whole thing, for while somewhat grudgingly admitting that it attracted good custom, he feared that after the novelty had worn off the competition of the street lamp with existing cheap refreshment establishments would be short lived.

And history seems to have proved our Editor right, for passing along Regent Street the other night we failed to discover a single 'Pluto' gas lamp.

Scottish Building Centre

At the 13th annual general meeting of the Scottish Building Centre, held in Glasgow on January 29, the Chairman, Colonel G. Gardner-McLean, stated that, for the Centre, the year 1950 had been one of increasing activity and satisfying progress in many ways. Colonel Gardner-McLean made it clear that, however unsettled the future might be, the primary aim of the Centre would be to continue serving the building industry with efficiency and accuracy.

To illustrate the assistance which the Centre had given to members of the building industry over the past year, the Chairman reported that the number of visitors had reached the satisfactory total of approximately 30,000, while the number of technical enquiries handled had increased by as much as 100% to 16,000. In addition to members of the various professions and trades, included in the numbers quoted were many members of the general public, and Colonel Gardner-McLean felt it was most gratifying that the Centre had been successful in such a short time in fostering the interest of the public to such an extent. Many of the professional and technical groups in the West of Scotland had continued throughout the year to take full advantage of the facilities provided by the Centre.

NEW PAISLEY SHOWROOMS

A view of the attractive interior of the new Paisley showrooms of the Scottish Gas Board, the opening of which was referred to in the Journal last week, together with a full description of these striking premises, which occupy a prominent position adjoining the principal shopping centre of the town.

A Hundred Years' Record

Welding shop extensions now in progress.

A CENTURY OF GAS PLANT MANUFACTURE BY W. C. HOLMES

NINETEEN hundred and fifty was the centenary year of W. C. Holmes and Co., Ltd., of Huddersfield, and to mark the occasion the firm has issued a very fine brochure recording 'The Story of 100 Years of Endeavour in the Service of the Gas Industry.' The following is abstracted from this highly interesting brochure. Many of the photographs which accompany the extracts were specially taken by the 'Gas Journal' Staff Photographer.

Straightaway we quote from the foreword:—'It was undoubtedly the inventive ability and purposeful initiative of William Cartwright Holmes, which less than 10 years after the death of William Murdoch turned his interests towards the construction of gas-making plant and set the course of the business which has endured for a century. Infusing into the firm a pioneering spirit, he sought to introduce new designs, to improve existing plant and to produce something better in the realm of lighting. His spirit of enterprise in the early life of the firm, like a torch burning with vivid flame, was handed on to those who followed for a hundred years, a spirit that has been responsible for much outstanding progress in the story of the gas industry.'

Towards the end of 1850 the firm of W. C. Holmes was established, though the background reverts to 1800. In 1850 William Cartwright Holmes was 23 years of age. Under his initiative and drive the firm expanded and prospered. Patents dating from 1853 onwards, taken out by W. C. Holmes, led to simplified gas plant. At Henley-in-Arden in 1862 a contract was placed for a gasworks at a cost of £1,600, 'half the capital to be provided by the contractor. In the following 25 years over 300 installations were carried out in towns, villages, and private houses. The King of Siam was one of the early gas consumers—an example of export trade in gas plant.'

The enterprise of the firm is demonstrated by its use of advertising, and the brochure includes an advertisement which appeared in the *Gas Journal* of January 20, 1857. And it is interesting that in 1872 the firm published a 'complete manual on gasworks management.'

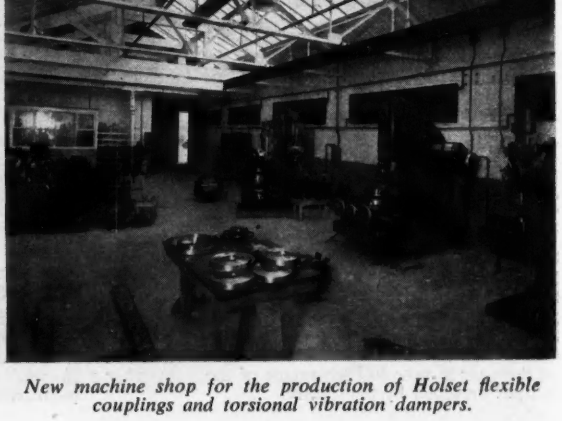
It was in 1880 that the firm moved from its first works at Hillhouse to Turnbridge. In 1882, William Cartwright Holmes died, and his three sons, J. W. C., P. F., and E. D., became associated in the management of the business. This partnership continued and in 1910 was incorporated as a private limited company with Mr. P. F. Holmes as Chairman and Governing Director. Following his death in 1941, after his association of 65 years, Messrs. D. M. Henshaw and F. B. Holmes became joint Governing Directors, Mr. D. M. Henshaw acting as Chairman, and Mr. Charles Cooper and Mr. Sidney G. Watson joined the Board, with Mr. Percy Rushworth as Secretary to the Company. In 1949 Mr. Harold Whiteley and Mr. Percy Rushworth and also Mr. Geoffrey F. Chambers of the Bryan Donkin Co., Ltd., were appointed to the Board of Directors.

The Turnbridge Works

Turnbridge works is the heart of an organisation whose products go to practically every gasworks in the United Kingdom and to every part of the globe. In 1945 further land was purchased to provide for future extensions, making the present area about 10 acres.

Experimental activities have provided the substance for the continual development of W. C. Holmes and Co. For this

One of the well-equipped and spacious drawing offices of W. C. Holmes & Co., Ltd.



New machine shop for the production of Holset flexible couplings and torsional vibration dampers.

reason the experimental branch, encouraged in the earliest days by the founder, has always been fostered and has led to the introduction of a number of new processes of value to the industry and to gas consumers. In recent years a separate research organisation has been created, where both pure and experimental research, up to the pilot plant stage, are pursued in anticipation of the future needs of the industry.

Specialisation

From 1850 onwards the firm constructed and put into operation complete town gas installations in various parts of England and Europe. Later a gradual trend towards specialisation took place in by-product recovery and manufacture.

In 1884 a patent was obtained for a new type of washer scrubber employing brushes made from West African piassava, a reed similar to that used for making bass brooms, which is treated by a special toughening process to eliminate brittleness. The washers were successfully employed in the removal of ammonia, hydrogen cyanide, naphthalene, and benzole from gas, and later on for gas dehydration. They were installed in a large number of gas undertakings in Great Britain, in the Colonies, and in the United States of America. In 1899 the manufacture of 'Western' double-faced valves was commenced.

About the year 1882, by-product coke ovens were first introduced into England for the production of blast furnace and foundry coke, and W. C. Holmes commenced the manufacture of by-product recovery plant for such works and of refining plant for ammonia, tar, and benzole. In 1911 the first installations for the continuous distillation of tar were designed and built under licence from Mr. H. P. Hird.

The manufacture of a new form of gas cooler known as the 'Super Type' horizontal tube condenser was started in 1913, and the first unit was erected for the Bournemouth Gas and Water Company. This was followed later by the vertical 'Multipass' condenser.

In 1920 a further patent was taken out for improvements of the rotary washer, which was known as the '1920' patent brush washer. In 1922 stage washing for naphthalene removal was commenced and developed, together with a self-contained automatically-controlled wash oil regeneration plant.

Research work carried out in 1922 resulated in the introduction of the process of gas dehydration, which was applied for the partial removal of water vapour from distributed gas. The process was covered by patents taken out jointly in 1924 by the firm and Mr. Charles Cooper, head of the Technical Department.

Gas Journal Photo

Part of the original foundry building at Turnbridge—the only portion of the original works still outstanding. This is used for B.M. gas meter production.

In 1926 the introduction of Holmes-Connersville station meters, exhausters, boosters, and air blowers was a notable extension of the firm's activities. The machines were made under licence from the Connersville Blower Company of Indiana, U.S.A., now absorbed into the Roots-Connersville Blower Corporation. Many important developments in the design and construction of these machines have been undertaken in this country by W. C. Holmes.

Small Connersville blowers are used for many industrial purposes, including the pressure charging and scavenging of diesel engines, and have been adopted as standard equipment by engine builders of national repute.

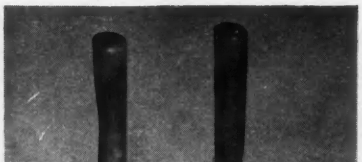
The first commercial plant for the improvement of ammonia still effluent in this country was constructed by Holmes for the Manchester Corporation Gas Department, and installed at the Partington works in 1929. Shortly afterwards the second installation was made for the chemical works attached to the Glasgow undertaking. Only one other such plant was constructed in this country up to the time of the outbreak of war, but since the termination of hostilities, interest in the subject has been revived to a considerable degree. In consequence, two installations employing new methods of liquor treatment are under construction by the Company for low temperature carbonisation plants in the Sheffield district, and other installations are in hand for works in the West Yorkshire and North Cheshire areas. These earlier successes and the experience obtained in operating the plants led to the recent contracts being placed with the Company.

The imposition of a duty on imported motor spirit in 1928 led to a considerable increase in the recovery of benzole in gasworks and coke ovens. In 1930, to meet a new demand for plant requiring the minimum of labour and supervision, the Company designed and produced a simplified type of benzole recovery plant. The unit comprised a Holmes brush

Recent office extensions seen through a gas main in course of manufacture.

Gas Journal Photo

The building on the left was originally a woollen mill, built in 1865. Recently acquired by W. C. Holmes, the building is used for light machinery workshops and for stores accommodation. Below are shown two hammers used for pegging Holmes brushes for rotary and multifilm washers. The photograph shows the wear of the shaft by constant friction and of the pane of the hammer due to driving in the oak pegs employed. The hammers have been in use for 10 years.



Gas Journal Photo

washer with a single circulating pump and automatic control of the oil stripping plant; 162 of these plants were installed in the nine years prior to the outbreak of the second world war, and 126 were built after September, 1939, to augment the supply of benzole and toluole for the manufacture of high explosives.

Another type of meter was introduced into Great Britain by the Company in 1930. This is the B.M. gas meter, which was the invention of Brandl and Marischka, of Vienna, and is specially suitable for metering gas supplied to industrial consumers or for use as a station meter on small gasworks. During the second world war over 400 B.M. meters were supplied through gas undertakings to ordnance factories, projectile factories, engineering works, and shipyards where gas was used for heat treatment.

At a time when the rotary washer was still employed extensively, the 'Static' washer made its debut in England. One form became known as the 'Multifilm' washer. The design was patented in 1930 and rapidly gained ground. Its adoption was favoured by the increasing availability of electric power on gasworks permitting the use of electric motors to drive the 'Monobloc' multiple cell pump. The pump was of the Company's own patented design and contributed largely to the success of the washer. This pump was also made or used under licence by other leading gas plant manufacturers.

Tower purifiers originated in Germany in 1930 and were the result of a drastic redesign of the deep box purifier.

Twelve installations are either being built or have been completed in England, and some are repeat orders. The largest plant to-date is a double set for 24 mill. cu.ft. of gas per day.

Two types of inert gas generators are manufactured by Holmes. One, the Harrison type made under licence from the Roots Connersville Blower Corporation and the other, the Kemp type, made by agreement with the C. M. Kemp Manufacturing Co., of America. Each machine has its particular field of application, the main difference being the flexibility of output obtained with the Kemp inert gas generator.

The Holmes-Elex detarrer is another speciality of the firm, and was introduced in 1934 to meet the growing demand for a higher standard of efficiency in tar extraction at gasworks and coke ovens. The detarrer embodies a patent design employing the use of concentric electrodes.

The success of this detarrer and the high efficiency of the electrical precipitation process for the treatment of all types of gases led to the building of Holmes-Elex precipitators, a development which has brought the Company into a wide field of activity in addition to that of the gas industry. Many installations have been erected, including plant for the elimination of dust from gases produced in blast furnaces, cement works, aluminium and carbon black factories, and for the treatment of other industrial gases. A mechanical method of dust extraction has also been developed for use on small plants and for special applications.

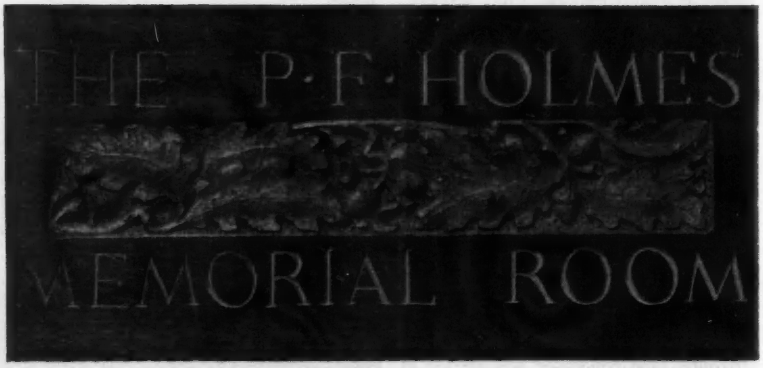
In 1934 the Company, in conjunction with the Gas Light and Coke Company, commenced the building of benzole recovery plants operating with an increased oil circulation with the object of bringing about a considerable reduction in content of sulphur compounds present in gas.

The distillation of the benzolised oil was carried out under vacuum in order to effect the recovery of benzole with the minimum steam consumption. A number of these installations were made during World War II and in subsequent years, particularly for large undertakings.

The manufacture of gas immersion heated metal melting pots for lead, tin, and stereotype metal has been commenced in recent years by arrangement with the C. M. Kemp Manufacturing Co.

In 1937 the firm introduced another process for the removal of organic sulphur compounds from town gas, and research developing into full scale operation was carried out at the company's experimental station at Mirfield gasworks, where the patents of Dr. Maxted, of Bristol University, were exploited. A licence was also obtained for the use of a similar patented process developed by the Gas Light and Coke Company. The process has been applied to the treatment of town gas used in industry, principally in the manufacture of special glasses, and for heat treatment of non-ferrous metals.

An extension to the field of gas dehydration has recently been undertaken in the manufacture of Holmes-Kemp



Gas Journal Photo

Memorial Panel on the entrance door of the boardroom and library.

drying equipment, to deal with air and gas drying to subzero dewpoints for the chemical and allied industries. Solid desiccants such as silica gel or activated alumina are employed, and the plant is manufactured under licence from the C. M. Kemp Manufacturing Co.

The Company has been interested in finding convenient methods of purification alternative to the established dry box process, and has become a licensee for the 'Manchester process.' Pilot plant work has been undertaken at Mirfield during recent years, and full scale installations, still of a somewhat experimental character, have been built elsewhere.

Early in 1947 a controlling interest was obtained in the firm of B. Thornton, Ltd., whose premises adjoin the Company's works at Turnbridge. Messrs. B. Thornton, Ltd., who were originally established in Brighouse, specialise in the supply of equipment for steel works and rolling mills. On moving to Huddersfield, they took over the works and business of Schofield and Taylor, old-established millwrights having a long record of association with the textile industry in the district as mill engine builders, and repairers of mill machinery.

B.H.D. Engineers, Ltd., a holding company, came into being on Feb. 7, 1949, and having acquired the whole of the share capital of W. C. Holmes and Co., Ltd., and of the Bryan Donkin Co., Ltd., controls the activities of these two companies and their subsidiaries. The Board is comprised solely of directors of the two senior companies, under the chairmanship of Mr. D. M. Henshaw.

To facilitate business in the south and ensure close contact with the London offices of clients at home and overseas, a staff is maintained at 119, Victoria Street, S.W.1. This office is under the supervision of a resident director and includes a technical department, drawing office and commercial section. This address is also the registered office of the B.H.D. Engineers, Ltd. Representation is also fully provided for in the Midlands area, at 21, Bennett's Hill, Birmingham.

AMERICAN SPOTLIGHT

Items of Topical Interest from the Contemporary Technical Press of Canada and the United States

NEW RECORDS

EACH year since the end of World War II has seen the industry in Canada registering substantial gains in customers served, in volume of gas sold, and in the amount of capital invested in plant and facilities. The spectacular growth was particularly emphasised in 1950 when new records were achieved in every sphere. Consumers at the end of the year numbered 24,362,000—a gain of 3.3%. Of this total, 14,894,000 were receiving natural gas—a gain of 12.7% Manufactured gas consumers declined by about 14.8%, which reflects the effect of the changeover by several large utility companies to the distribution of straight natural gas or mixed gas. Total sales of gas showed a gain of 15.8%. Sales of gas appliances also reached new high levels: gas ranges, 3,100,000; automatic gas water heaters, 2,250,000; central heating units, more than a million. Refrigerator sales were 50% up, while gas air-conditioning equipment also reached a new peak. (*Canadian Gas Journal.*)

* * *

DETONATION COMBUSTION

A METHOD of burning gas in industry through application of the principles of jet propulsion to stationary industrial heating has been brought to an advanced experimental stage, according to an announcement by the A.G.A. in the *American Gas Journal.*

Under the Association's industrial gas research programme experiments have been developed for the gas industry by which gas has been burned by means of 'detonation combustion' at such rapid rates that heat can be produced in a steel melting furnace or a heat treating furnace, many times faster than even the most modern equipment can produce today.

Detonation combustion is achieved through a rapid series of instantaneous explosions, each of which resembles the explosions that jet-propel a rocket hundreds of miles into the air. By concentrating the heat of almost instantaneously consecutive explosions into a furnace, melter or other industrial heating apparatus, the capacity of that apparatus to produce is enlarged many times. Research sponsored by the gas industry indicated that through the detonation combustion method heat releases and temperatures may be attained in a given space that are 100-200 times faster and greater than those possible under present combustion methods. Experimental detonation burners known as 'resonant rotary port burners' have been built to interpret and produce these high heat releases.

* * *

KENTUCKY GAS SHORTAGE

THE Cincinnati area is so short of gas that the Kentucky State Public Service Commission has agreed to an application by the Union Light, Heat & Power Company of Covington to refuse to supply gas for new space heating installations except where hardship would result. Restrictions have been in effect in Kentucky for several years whereby any company may decline to sell space heating gas to such new consumers as big industrial plant and large hotels, but this is the first company to request special restrictions. (*Gas Age.*)

* * *

BILLING BY TELETYPE

WHILE few British area gas boards are likely to find themselves in the position of serving consumers 200 miles distant from their headquarters, this is a not uncommon problem in the States. The Southern California Gas Company is experimenting with a method of improving the efficiency of its billing operations in an outlying division by using teletype machines to transmit accounting information.

A tape punch translates the information contained in the meter books into a series of holes on a paper tape. This passes through the teletype sender, which transmits the information over 200 miles of leased company wire to Los Angeles, where it is transferred to a punched card record for subsequent billing to the consumers. This system is claimed to cost less than any other. (*American Gas Journal.*)

* * *

OLD FAITHFUL

DURING the November hurricanes which battered the city of Boston, old, reliable gas lamps did valiant service. Raging winds put many electric power lines out of commission for hours. Had it not been for the gas lights which were turned on, many sections of the city would have been in total darkness. Officials, who had recently considered tearing down the gas lights, now have something to think about. (*Gas Age.*)

* * *

RIVER DAMMED

CONSTRUCTION crews of Lone Star Gas Co. have completed another battle with the treacherous Red River, forming the boundary between Texas and Oklahoma, by sinking a dual gas line deep beneath the shifting waters of the stream. In order to sink the dual 10-in line beneath the river bed, it was necessary to hold the river back with coffer dams, one on each side of the stream. First the Oklahoma side was dammed with a barrier 60 ft. wide and from 15 to 20 ft. high. After the pipe had been laid out into the channel from the Oklahoma side, the crews moved to the Texas bank to repeat the performance. Although the Texas side is only a few dozen feet from the coffer dam on the Oklahoma side, heavy equipment had to be routed across the nearest highway bridges, making a haul of 100 miles around. Three 8 in. centrifugal pumps with vacuum boosters were used to lift seepage water out of the ditch. The dual lines are 4,000 ft. long including the on-shore sections. (*Gas Age.*)

PHOTOGRAPHY

Our Exhibition Reviewed

GLANCING back to our Photographic Exhibition in November, we feel proud. We put on an Art Show, an achievement beyond all but a few specialist Publishing Houses, and we pleased many people who came to view it. Our photographer, Edward Brown, A.R.P.S., amazed many by his versatility, and it is amply demonstrated that he is a man who can turn his hand to any branch of his art and do a good job. We take this further opportunity of thanking the Directors and staff of the Building Centre for their co-operation, without which the Exhibition would not have been held.

From a leading Publicity Manager

Many years ago the writer, then a young and enthusiastic amateur photographer, was told by a well-known professional: 'Any trained photographer who applies himself diligently can produce a few good photographs of selected subjects. It is the ability to continue to produce good photographs over a wide range of subjects taken under varying conditions which distinguishes the good photographer.'

The opportunity which the writer has since had of seeing the work of many photographers, both professional and amateur, has confirmed the wisdom of this remark. It applies particularly to industrial photography where the subjects may range from the dusty blackness of a coal mine to the brilliant cleanliness of a hospital operating theatre. The range is further extended by consideration of the use to which the photography will be put; it may need to be an accurate record, a live documentary, or a creative work with a striking pictorial content which can be used for an advertisement. Such work requires not only considerable versatility of technique but also imagination—the imagination of the artist who senses the love of the cabinet-maker for his chisel and portrays it in his picture so that you can sense it too.

The collection of photographs by Edward Brown, A.R.P.S., recently displayed at the Building Centre, London, was an excellent example of the great diversity of subject-matter which an industrial photographer is today required to handle. The exhibition also showed that Mr. Brown is an exceptionally versatile photographer with a complete command of camera technique and a flair for first-class documentary work. His handling of figures is particularly good. Altogether there were over 60 enlargements, most of which were 20 in. by 16 in. in size, and there was a pleasing uniformity of presentation which is only possible in a one-man show. Limitations of space will not permit a description of each, but there were some which must be mentioned.

One outstanding picture (reproduced here) was titled 'Once Upon a Time'—a charming group of children naturally posed around a fireplace, listening with intent expressions to the telling of a fairy story. They were in a home for backward children. This was documentary photography at its best, technically perfect, with 'firelighting' so well arranged that it was impossible to detect.

Another 'live' documentary had apparently been exposed solely to the light of the sun-arc, which was also included in the picture. The absence of lens flare in such a difficult technical subject was noteworthy. Near the entrance was a group of four pictures entitled 'No Names—No Packdrill.' They were miniature camera shots taken during a spare-time camp with the 1st Bn. London Scottish. One picture, a candid portrait of the Sergeant-Major in operation, was so realistic as to be disconcerting. One resisted the inclination to jump to it.

A complete change of technique was required for 'Gin Lane' and 'The Rake's Progress,' both copies of Hogarth's well-known drawings. Copying is an exacting process which demands very skilful operation if all the detail present in the original is to be retained. The copies were successful in this respect, and they were excellent examples of pure photographic technique. On the other hand, a straight portrait had not, in the writer's opinion, done full justice to a charming model. The print was not quite up to Mr. Brown's standard.

Straightforward records of engineering subjects, both exterior and interior, were well represented. The illustration of an early stage in the construction of plant by W. J. Jenkins & Co., Ltd., was remarkable for the fineness of its detail. 'Gas Stocks' (reproduced) was a picture, in true perspective, of our old friend the gasholder, a subject which can so easily be distorted. Mention is well merited by another documentary—a scene set in a display studio of the West Midlands Gas Board.

The last panel of prints was dominated by a splendid set of documentary pictures taken at Messrs. Mears and Stainbanks Whitechapel Bell foundries. The various stages in the manufacture of a bell are followed from the shaping of the core to the tuning of the bell. 'Punching the Inscription,' a close-up in the modern style, was fine photography indeed, and well deserved the honour awarded to it recently when it was selected for inclusion in the Annual Exhibition of the Institute of British Photographers. [It is reproduced here. —Ed.] In the writer's opinion, 'Making Wheels and Pulleys,' which showed a carpenter at work in his workshop, was even better. This picture, which was lit by a shaft of light from above, had that wealth of detail which photography gives combined with an 'old master' style which was most satisfying.

To sum up the exhibition as a whole, one is most impressed by Mr. Brown's versatility. His camera has travelled far and recorded faithfully. Technically his work is of a very high standard indeed and, as many of his prints show, he can, when occasion demands, produce photographs which are also pictures. Mr. Brown is seen at his best in that difficult branch of photography known as 'documentary'—*i.e.*, the portraying of natural models at work in their natural surroundings. Finally, an inconspicuous note which appeared in the exhibition catalogue should be quoted, for it says much for Mr. Brown's skill: 'There has been no retouching in any negative or print in this exhibition.'

* * *

From a Photographic Critic

A small exhibition of photographs covering a very wide range of subjects is, of course, difficult to review in general terms. To select certain groups, however, for closer criticism might be equally misleading, particularly as Mr. Brown has a talent for adapting his photographic art to the needs of his subject. For instance, he is able to catch the inspiration of the moment, as he does in pictures of children at the Geffrye Museum or at an infant clinic and again in action—and inaction—portraits of military personnel.

At the other end of the photographic scale, Mr. Brown's technique enables him to convey the massive shapes and heavy atmosphere of work in a bell-foundry. Of this group, the photograph 'Punching the Inscription' has, indeed, been selected to appear in the Exhibition of the Institute of British Photographers, where it is shown in good company.

Mr. Brown's concentration on his main centre of interest does, in a few instances, tend to make him overlook small distracting details, when one judges the photograph as a whole; but as remarked in the first instance, these should be regarded as minor matters in reviewing the wide scope of subjects selected for this most interesting exhibition.

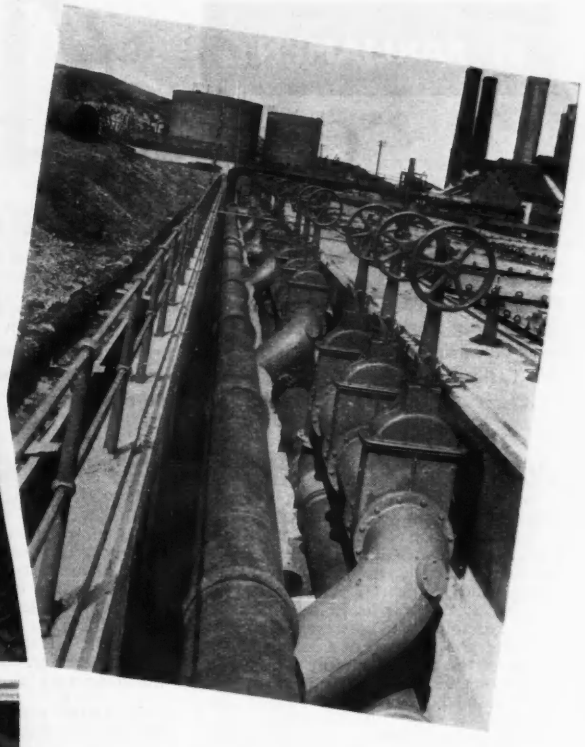
* * *

From Letters

'. . . Perhaps you would allow me to take this opportunity of congratulating Mr. Brown on the very excellent display of his Art, which I found most impressive.'

'. . . We thought that it was a very attractive display, but what impressed us most was the versatility of the work. In fact, some of the techniques were so varied that it was difficult to realise at times that the photographs were all the work of one man.'

'. . . and took the opportunity of calling in to see the photos in Conduit Street. They struck me as being of first class quality and most effective, particularly the purely industrial types.'



Top Left: **'Gas Stocks.' By permission of Clayton Son & Co., Ltd.**

Top Right: **'Pipes in Perspective.' By permission of Firth Blakeley Sons & Co., Ltd.**

Left: **'Once Upon a Time.'**

Bottom Left: **'Inscribing a Bell.' Selected for the Annual Exhibition of the Institute of British Photographers.**

Bottom Right: **'Model-maker.'**

IN PARLIAMENT

Grotesque Fuel Situation

As far as the gas industry is concerned, chief interest in Parliament last week lay in Thursday's debate on the coal situation—a grave situation indeed and one for which the Government must take responsibility and admit its weakness. The price of coal has been advanced by 4s. 2d. a ton, the price of coke by 6s. 3d. But where is the coal, and where is the coke? As a nation we are ill fed and ill warmed. No wonder there is an alarming amount of sickness about. No nation can expect to be other than supine if living conditions are those of semi-famine and semi-refrigeration.

MR. BRENDAN BRACKEN moved this amendment: 'That this House deplores the contrast between Ministerial promises of adequate supplies and stocks of coal and the present shortages, which have inflicted great hardships in the home and threaten widespread industrial dislocation and stoppages.' The crisis, he said, had been long foretold, but, disregarding grave warning, the Minister of Fuel and Power made in the House on July 12 a speech abounding in optimism, and in an interview with the Press in September was positively reckless. Today many homes were very cold and supplies of gas and electricity were affected. Because of the Minister's failure to maintain stocks almost every home in the country suffered, industrial production might be greatly diminished, and employment was imperilled. The Minister had gambled against the weather. The National Coal Board could not handle the two cardinal problems—intractable absenteeism and the finding of recruits to replace the unfit and aged miners. Without decentralisation every cold winter would produce a coal crisis, and an improvident Minister must shamefacedly come to the House to announce a long list of cuts he had ordained.

Mr. Noel-Baker's Defence

Mr. Noel-Baker said that the general charge against the miners that less absenteeism would give more coal, broke down. Of the 12% or so of absenteeism last year 7% was due to sickness and accidents. He asked the House to reject the motion. He did not admit the charges it implied. In calculating consumption bad weather and a hard winter were taken into account. The Government had aimed at 16,500,000 tons of winter stocks on October 31. At that date they were 700,000 tons short. An increase of 7,500,000 tons in home consumption in a single year presented a formidable problem not only for the present winter months but also for next winter and for the coming years. He was as anxious about the next two years as he was about the next two months. The problem was to get more coal and to save more coal.

Mr. Noel-Baker went on to say that their greatest immediate anxiety was about stocks for the power stations. The most serious single blow that could be struck at industry and the housewife would be the shutting down of power stations for want of coal. During the last eight weeks the power stations had used enormous quantities of coal. In one week the use of electricity was 23% more than a year ago. Power stations used the same coal as industry and the only way to get the extra coal was to deliver less to industry than they had planned. Unless we had prolonged harsh weather, they hoped that the under-delivery would be roughly 15%.

His next greatest anxiety had been household coal. He promised to give an extra million tons to the household market in 1950; in fact, the housewife had 1,600,000 more tons of coal than in 1949, 50,000 tons more boiler fuel, and 600,000 tons more coke. The promise had been handsomely fulfilled.

Mr. Colegate (Burton, C.) asked what was being done about the sale of more electrical apparatus.

Mr. Noel-Baker replied that almost all electricity boards had stopped sales completely. Private manufacturers and shops were still selling them, but the Association of Manufacturers had joined with the boards in appealing for less use of electricity and gas.

The Opposition amendment was negatived by 300 votes to 289—a majority of 11.

The Gas Strike and Communism

On January 29 Mr. Ungoed-Thomas raised the question of the Attorney-General's responsibilities for prosecutions, saying that the public was concerned to know the principles on which his discretion was exercised. In reply Sir Hartley Shawcross said that the exercise of discretion in a quasi-judicial way was one of the duties of the Attorney-General's office. In deciding to prosecute, repercussions on himself, on the political fortunes of his party or Government, were altogether excluded. In deciding whether to prosecute he had to consult his colleagues in the Government, to become acquainted with the necessary facts and the probable effects of prosecution, but the responsibility for the eventual decision rested with him.

Continuing, Sir Hartley Shawcross explained that he prosecuted in the case of the gas strike in North London recently because the public was being caused great inconvenience and hardship. Moreover, the information available to him showed that while there was a pretence being made of urging strikers to return to work, the truth was that the Communists were anxious to see the strike continue. There was the North London organiser for the Amalgamated Engineering Union, an avowed Communist, whose official duty it was to his union to secure return to work but who bent his unofficial efforts in the opposite direction. In his office, as a mere clerk, as nominally he was, or as an invigilator over the organiser, as in accordance with Communist technique might be was a man who was implicated in the Communist conspiracy in Meerut, and who in this country in 1938 got six years' penal servitude for acting as a professional spy for Russia.

In that case the strike prosecution brought home to everybody that what was in point was not really some matter of industrial regulation but that the criminal law was being broken; and the prosecution had a salutary effect.

Non-Ferrous Scrap

A statement was made in the House of Commons on January 29 by the Minister of Supply regarding non-ferrous scrap control. Mr. G. R. Strauss said that he intended to make orders controlling the price and distribution of non-ferrous scrap in order to obtain the maximum amount of scrap. The British Iron and Steel Federation had undertaken a drive to secure larger quantities of ferrous scrap from sources in this country and was buying all that could be obtained from abroad. Copper supplies for civilian production, he said, would have to be reduced as defence needs progressively increased, and it would be necessary to limit supplies to consumers to 85% of the rate in the first six months of 1950.

Hire Purchase

In the Commons on January 30 Mr. Hugh Gaitskell, Chancellor of the Exchequer, stated that both the Capital Issues Committee and the banks were continuing to give full co-operation to the Government in seeking to ensure that financial facilities for hire purchase were not increased. He was considering, however, whether any further action was desirable.

Mr. Gaitskell had been asked by Mr. Maudling (C., Barnet) whether in view of the increasing danger of inflation, he would take further steps to restrict the provision of hire purchase credit facilities for consumer goods.

(Continued on p. 365)

IN 1950

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DUDLEY	89
GLOUCESTER *(Second Installation)*	131
GRIMSBY *(Fifth Installation)*	32
HEREFORD *(Third Installation)*	23
HUDDERSFIELD	189
MARGATE *(Third Installation)*	55
NOTTINGHAM *(Third Installation)*	141
NOTTINGHAM *(Fourth Installation)*	141
NEWTON-ON-AYR	25
NEWMARKET *(Third Installation)*	11
OLDHAM *(Third Installation)*	122
POOLE *(Seventh Installation)*	237
PAISLEY *(Third Installation)*	69
REDDITCH *(Third Installation)*	46
CHESTER *(Third Installation)*	66

INTERMITTENT VERTICAL CHAMBER INSTALLATIONS

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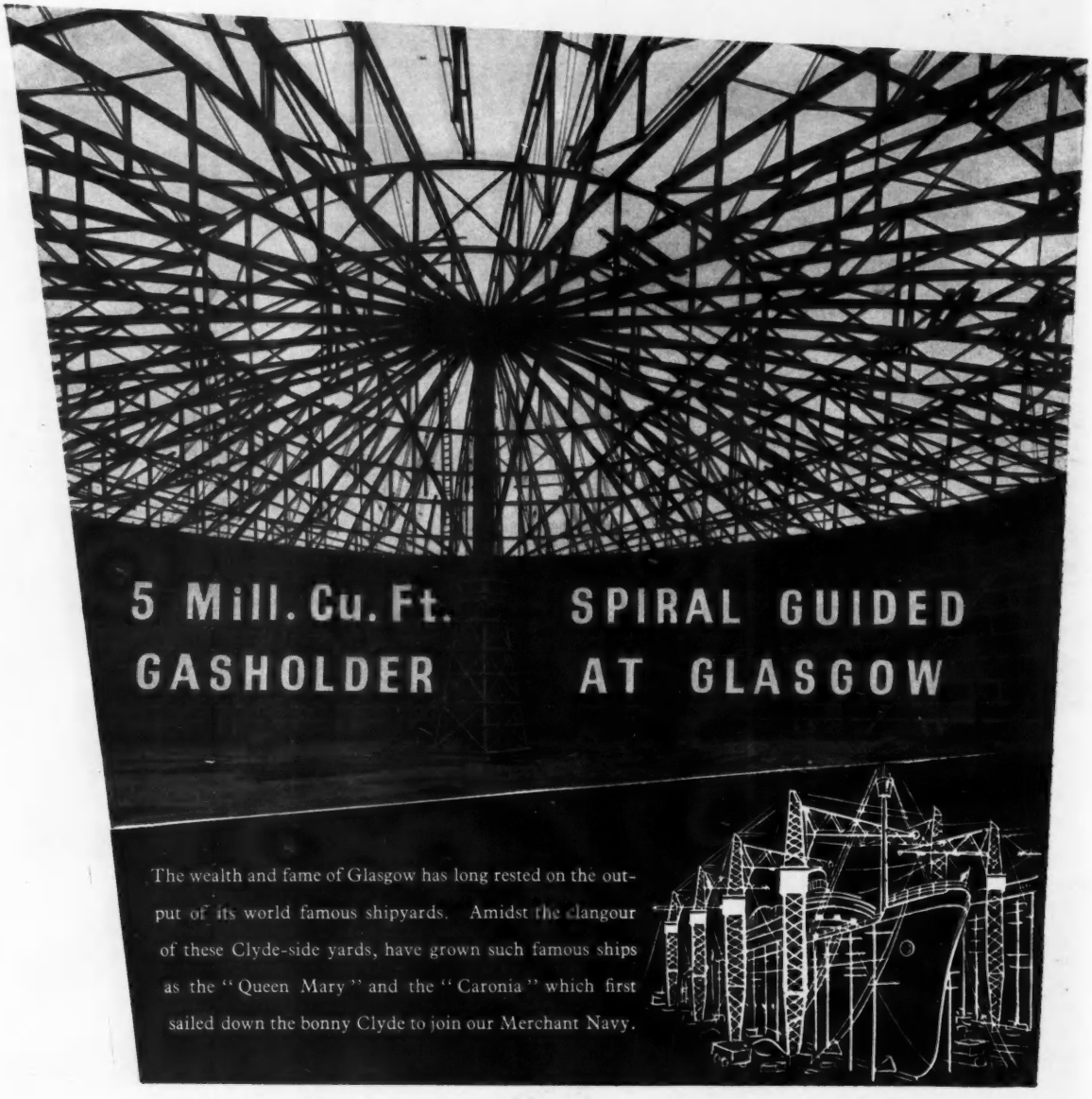

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The Performance of CONTINUOUS VERTICAL RETORTS

The Author

By C. H. LEWIS, M.Sc., M.Inst.Gas E.,
North Thames Gas Board.

We publish below the discussion which followed Mr. Lewis's paper to the London and Southern Junior Gas Association on January 17, which appeared in the *Journal* for January 24 (p. 225).

The Chairman (Mr. D. C. Woodall, Maidstone) said that the North Thames Gas Board appeared to be carbonising Durham coals in continuous vertical retorts with success, and perhaps Mr. Lewis would assure him that this was correct.

Dr. S. Pexton (North Thames Gas Board): Large vertical retorts do not give such high gas yields as do small retorts, although they offer some economy in construction and operation. The provision of uniform minor axis taper in large retorts has produced easier coal travel and higher gas outputs. There has been only a small increase in gas yield but the coke has benefited by a higher volatile therm content. It now remains to be seen whether the provision of major axis taper in large retorts will improve the gas yield. The preheating of the secondary air by utilising part of the sensible heat of the coke leaving the retorts has resulted in a substantial saving of fuel. The preheating of the secondary air has somewhat reduced the effective heated length of retort and so reduced gas output. This, however, has been more than compensated for by the increased throughput following the provision of continuous minor axis taper.

Since the adoption of lambent heating, preheating of the secondary air supply, uniform minor axis taper, and the addition of extra insulation at Bow Common, the extra saleable coke from the carbonisation of 150,000 tons of coal per annum amounts to 2,500 tons. This performance will be somewhat improved when it is possible to supply the whole steam and power requirements of the works from the reduced amount of waste heat steam now available. This will involve the use of higher pressures in the waste heat boilers and the fuller use of back pressure machines for providing all the power requirements and at the same time passing low pressure steam for process work in the retorts and producers.

Relative Thermal Yields

Mr. A. F. Cottrell (Woodall-Duckham Company): The relative thermal yields from large and small retorts is obviously a matter much in the mind of the author and is also one on which I should like to make a few observations. When using Yorkshire coals at Bow Common in 1948, 83 equivalent therms per ton were obtained compared with 86.4 in the Kensal Green twin 44 in. retorts. There was, however, a considerable difference in coal rank which, according to Burns in his paper to the World Power Conference, might make the usual straight correction for inerts inapplicable. Consequently it is a little difficult to know whether these figures are strictly comparable and some doubt must therefore be felt on deductions which might be drawn from them.

At Fulham, however, the large 103 in. retorts gave an average yield over some months of 81.9 therms per ton on Durham coals against 80.3 in the Kensal Green twins on similar coals of apparently similar rank. Thus we have a case where the yield from the smaller retorts appears to be lower than that from the largest size.

There is also some reference to tests at Bolton in 63 in. retorts giving higher thermal yields than larger retorts, but this appears to be an error as the Bolton retorts are 76 in., although they have 62 in. top ironwork (thus the considerable amount of taper). If good results were obtained at Bolton, then this may be a case for a large, not a small, retort. On balance, therefore, one might justifiably doubt whether there is much proof of superior thermal yields from the smaller retorts, but it is a matter of much interest and one that merits further consideration.

Now as regards the retort with continuous taper. It seems almost certain that the original inventors of continuous vertical retorts must have had the idea of building retorts with continuous taper because, at first sight, this is the obvious shape. It is interesting to note, therefore, that the retorts did in fact develop away from this shape so that practically all present-day installations are without major axis taper, at any rate in the silica, and without minor axis taper in the lower 10 ft. or so.

Designers and builders of vertical retort plants, of course, are bound to aim at a degree of standardisation if they are to serve the best interests of the industry, and retorts of this shape with lambent heating, air-cooled floor joists, and improved front wall insulation have been found to give excellent results and flexibility over wide ranges. There are installations of such retorts working on coals of practically all types, having swelling numbers from 0 to 9 and using 4% to 30% steam and making calorific values from 400 to 550 B.Th.U. which are giving considerable satisfaction and on the whole are hardly likely to benefit from a change in shape. In face of this, and in view of present-day variations in availability of coal, coke, and oil which may necessitate changes in calorific value at short notice, it is as well to take careful note of the author's warning that continuous taper is only advantageous under particular conditions of working.

Unique Conditions

Now, in the North Thames Gas Board area, conditions are unique in that large retort houses can be planned to work for years ahead as more or less in flexible base load units making a pre-arranged high calorific value and using a given type of coal. Under such conditions a departure from standard practice may be justified and certainly there are indications that if we use highly swelling coals and make high calorific value gas which calls for a very deep coal cone, there is a good case for continuous taper, which assures easier working with higher throughput and higher thermal output. The continuous taper, however, commits us to these constant conditions so that we cannot decide after a few months to change to a lower calorific value unless we are prepared to suffer what may be a considerable loss in overall efficiency.

It seems, therefore, that this change in taper is only justified under the above conditions, and it is not surprising to find the author somewhat diffident in attributing the extra therms per ton obtained at Bow Common with the lower swelling Yorkshire coals to the change in shape. The experiment with continuous taper in the new retorts at Kensal Green will give some valuable additional information on this matter which will be most interesting.

From the point of view of overall results, I think the thing that stands out most clearly is the progressive improvement in the fuel consumption, which represents a not inconsiderable achievement in these days of high priced coke. It reacts in two ways—viz., by releasing additional fuel for sale and by increasing the Gas Board's revenue.

I feel that the author was perhaps unnecessarily despondent about the relative results from Lausanne in 1910 and at the

present day, and I am going to suggest that the Lausanne figures quoted may be a little deceiving, as the calorific value was most probably calculated at 0° and 760 mm., so that at 60°F. and 30 in. Hg. the 605 B.Th.U. become 563, while the volume was calculated at 15°C. and 760 mm.

Dr. F. R. Weston (North Thames Gas Board): The design and operation of continuous vertical retorts has been a pet subject of mine for several years. Some of the facts and figures that Mr. Lewis has given have already appeared in various publications, but the majority have remained in reports and log books available only to the few. Now we have all these assembled in their proper relation to each other and are able to follow the reasoning that has led to the various developments of one system of continuous vertical retorts right from its inception.

A figure of 83 therms per ton is given for the equivalent thermal yield of No. 2 bench, Bow Common, in 1948. Since that time the average rank of the coals carbonised has continued to fall due to the inclusion of an increasing proportion of Midland coals, and the average B.S.I. swelling index is now 3½. With a throughput of 9.4 tons per retort per day, against a figure of 8.5 in 1944 and 9.3 in 1948, an equivalent thermal yield of 84.8 was obtained over one month recently, the equivalent fuel consumption being just under 10%. After two years' experience with the bench it has therefore been possible to improve on the original results.

Radiation Losses

Turning now to radiation losses, Mr. Lewis gives the calculated saving in fuel due to the increased insulation of the walls of this bench, to which I might add one further refinement. The figures he gives are calculated from the average measured surface temperatures of the brickwork. Each side wall, however, also contains numerous iron damper boxes, and measurements showed that at a time when the brick surface averaged 69°C. the iron boxes averaged 137°C., from which it can be calculated that 3.5% of the total heat radiated from the side walls comes from the damper boxes. Consequently, it has been decided that on the new benches of retorts to be constructed at Kensal Green, as many as possible of the iron boxes will be replaced with brick plugs. In the cases of those which have to be retained as they are used for daily temperature readings, their sizes will be reduced and larger, high temperature, insulating bricks will be used for their internal protection.

The increased thermal insulation was applied to No. 2 bench, not only to lower the fuel consumption, but also to improve the comfort conditions for operatives using the side platforms. It was, therefore, very disappointing to find that, in spite of its increased insulation and consequent lower surface temperature, the actual air temperatures on the various side platforms were 10° to 15°C. higher than on No. 1 bench, the maximum difference being on the lower platforms. This appeared to be due entirely to the upward current of hot air from beneath the setting.

On No. 1 bench the secondary air enters the setting from the sides, making two passes (to the centre and back to the sides) before rising to the various combustion chambers. On No. 2 bench the air enters beneath the middle of the setting and makes three passes. There appears to be more hot air available to travel up the sides of the setting, and on the non-producer side it was found that, by making the lowest platform solid and extending right up to the face of the setting, the air temperature at face level was lowered by more than 10°C. It has, therefore, been specified that at Kensal Green the platforms should be treated in the same manner, and at the same time increased in width by 50%.

Finally, I should like to ask Mr. Lewis to clarify the description for calculating the equivalent fuel consumption. An example is given showing how this is worked out from a coal containing 10% ash plus moisture. The argument is then developed to show that the fuel consumption is not affected to any extent by small changes in the ash and moisture content of the coal charged, and then concludes 'The equivalent fuel consumption used for comparison purposes in this paper is, therefore, calculated from the equivalent thermal yield and the fuel requirement per therm of gas made from coal containing 8% ash plus moisture, in the manner indicated above.'

Since the example given is for a coal containing 10% ash plus moisture and the whole argument is that the fuel consumption is independent of these, should not the words 'containing 8% ash plus moisture' be deleted from this last sentence?

Mr. A. H. Savill (South Eastern Gas Board): In his introduction Mr. Lewis points out that the difference in behaviour of Yorkshire and Durham coals in continuous vertical retorts is so marked that no numerical co-ordination is possible. I wonder if he would care to expand this statement a little. I believe that the ease with which coal travels through a vertical retort depends upon a number of factors, among which are the coking properties of the coal and the size of the particles to be carbonised, a nut coal giving the same thermal yield per ton and permitting a larger output of gas per retort per day than a slack or fine coal. I should be pleased if the author would tell us what particular property of Durham coals is responsible for the lower throughput and for the lower steaming efficiency which is expected with coals from this source. Is it a matter of the plastic range or are coal expansion and/or plasticity involved.

The author raises the question of the *gross coke* and breeze yield and although I agree that this is not of major importance in the paper, I should be interested to have any information that he may have regarding the gross yield of coke and breeze which is obtained in continuous vertical retort practice as compared with the yield in horizontals or intermittent vertical chambers. Accurate information on this subject is woefully lacking and it may be that the carefully controlled performance tests which the Gas Light and Coke Company and the North Thames Gas Board have carried out may have enabled them to form useful comparisons of the quantity of solid residue produced from coal carbonised in the four most widely used types of carbonising plant.

Mr. Lewis traces the development of the Woodall-Duckham continuous vertical retort over its whole range of sizes from the earliest retort with a 21 in. major axis to the more modern 103 in. retorts, and it would be interesting to have his opinion as to the size of retort which gives the highest thermal yield per ton of coal and the lowest fuel consumption.

I am surprised to note that high H.E.V.'s are usually associated with high tar yields, suggesting that by further modification of the cracking conditions the gas yield might be even higher than recorded. The high volatile therm content of the coke produced during one of the Fulham tests has been referred to, and perhaps Mr. Lewis will indicate the usual volatile therm content of coke from this type of plant.

Retort Life

An aspect of carbonisation in continuous vertical retorts which has not been touched upon by the author in his paper is the question of retort life. What in Mr. Lewis' opinion is the retort life which can be expected from a battery of continuous verticals operated as a base load plant and at optimum throughput. Further, is it the practice of the North Thames Gas Board to work the retorts right out without shutting down or is it usual to carry out some sort of interim repair? I should be interested also to know what exactly is the deciding factor which causes a retort to be unfit for further service. Is it spalling, distortion, or holing?

One final point, I should like to ask the author how closely it is possible to approach, under normal day-to-day practice with only normal supervision, the yields obtained in the performance tests.

Mr. Leslie T. Minchin: I am puzzled by the use of gaseous therms/ton of coal as a criterion of plant performance. Surely this must depend entirely on the volatile content of the coal. Secondly, the author states that the coal core must not come into contact with the steam. Why is this? Would not coal react just as well as coke? From the equivalent consumption of fuel figures it would appear that an overall thermal efficiency of 88% to 90% is being achieved in some cases. The overall efficiency of a gasworks is usually quoted as being about 75%. Does the author think that by use of his technique the overall efficiency could be increased to 88-90%? Or has the thermal economy practised led to a reduction in available waste heat steam, so that correspondingly more energy must be expended on steam raising?

I gather that the theoretical efficiency of carbonisation could —if losses were eliminated entirely—approach 98%. Jansen, in Norway, is at present claiming that by electrical carbonisation he can get down to a current usage of only 125 kWh/tonne, which represents in heat only about 1½% of the coal used (though if the current was produced in a thermal power station it would, of course, require more coal than this).

The careful work which the author describes on tapering of retorts seems designed to give smoothest possible flow to

the charge. But is this really desirable? Surely the aim ought to be the breaking up of the flow so that some of the cold core was brought nearer the hot walls. To use an analogy with fluid flow, we should then be replacing conduction by convection—a much quicker method of heat transfer. I should have thought that one could have considerably shortened the retort (or increased throughput) if some means of stirring up the charge could be introduced.

Dr. A. E. Haffner (North Thames Gas Board): Like Mr. Lewis, I have been involved in efficiency trials of carbonising plant under the great and inspired leadership of Dr. Pexton, and it has been a particular pleasure for me to hear this masterly review by Mr. Lewis and to hear him and others in the discussion pay their tribute to Dr. Pexton. As the date from the tests accumulate, the subject becomes fraught with much detail and this painstaking survey of the results achieved over a period of 27 years is most timely.

Some reference has been made to No. 4 house, Fulham, and questions have been asked whether Durham run-of-mine coal can be carbonised in vertical retorts. This particular retort house has now carbonised about 3 mill. tons of Durham run-of-mine coal as well as a small proportion of Durham nut coal, supplied irregularly. That this was possible in the early pioneer days of 1929 was due not only to the designers, builders, and operating engineers, but to the stokers, who were an outstanding group of men at that time. Further reference has been made to Fulham No. 4 retort house in respect of the decision to reset in 1948 with downward heating.

The Bolton Tests

The Bolton tests, for which I was responsible, were carried out on a 76 in. upwardly-heated single retort fed with a single source of Durham run-of-mine coal, and some superiority in results could be expected for this reason, compared with a full installation supplied with Durham run-of-mine coals of diverse origin. Furthermore, one of the benches in Fulham's No. 4 had been previously converted to upward heating and it had been found that the occurrence of spalling lower down the retort, as it does with upward heating, was less favourable to smooth coal travel than in downwardly heated retorts where the spalling zone is within reach of top rodding. The extra steam derived from downward heating was of value at a station where the boosting load is high, but subsequent extension to breeze-burning chain-grate stoker boilers has reduced the importance of this factor. The top ironwork was renewed in any case, so that there was an opportunity to have introduced major axis taper, but at that time it was considered that it would be adequate to have increased minor axis taper and so the further structural and costly complications of retort structure and redesign of top fittings due to introduction of major axis taper were avoided.

But there were other factors changed at the same time, and Mr. Lewis has referred to the steeper slope of the curved plate of the extractor and the location of the extractor more directly under the retort. The assessment of the benefits of this factor is difficult. Another change was made, for which present operators continue to be grateful, and that is the extension of the producer capacity, which, coupled with the reduction in fuel consumption due to increased secondary air preheat, has made available an adequate supply of producer gas without over-burdening the producers.

To give relative weight to the benefits derived from increased minor axis taper, modification to extractor design and provision of adequate producer gas capacity is not possible, but the combined effect has meant that operation has been easier, thermal output per retort greater, and thermal yield per ton of coal greater than before the changes were made. Mr. Lewis has referred to the higher calorific value, and this has helped to make it possible to maintain full benzole extraction and to bring into more regular use an old 1.5 mill. blue water gas set.

Turning from the Fulham case to the cross-sectional diagrams of vertical retorts, it should be remembered that these precise and accurate diagrams represent new retorts and that the effective dimensions are affected each scurfing cycle by deposits of scurf and, over longer periods, by spalling, erosion, and possibly distortion of the retorts. In the Kensal Green installation, reference is made to the effect of coal segregation and I believe members would be interested to know of attempts to control segregation. Although these did not succeed, the failure was instructive and the attempt worth while.

Mr. K. L. Clark (W. J. Jenkins & Co., Ltd.): The author suggests that within limits the fuel consumption is not materially affected by small changes in the ash and moisture content of the coal carbonised. In the West of England, coals containing 20% of ash and having a swelling number of 9, are quite common; what effect does Mr. Lewis consider this would have on the fuel consumption?

Mr. Walker (North Thames Gas Board): I have failed to hear any reference to the carbonising temperatures employed in the tests. We have heard a good deal about the different degrees of taper of the retorts in relation to coal travel and thermal yield, etc. The temperature of carbonisation is an important factor and the suitable zoning of temperature throughout the length of a vertical retort, having regard to the type of coal to be carbonised, has great bearing on the results. Omission to mention this is to me somewhat surprising. I would ask Mr. Lewis if he can give any figures for the zoning of temperatures employed in these Woodall-Duckham retorts when carbonising Durham and Yorkshire coals and for the downwardly and upwardly heated settings.

Also, I believe it is recognised that the quality of present-day refractories is not up to pre-war, and I have heard that it is considered advisable in some quarters to reduce combustion chamber temperatures slightly—say, from a maximum of 1,350°C. to 1,320°C. or even 1,300°C.—in order to obtain a working life with the present-day qualities compatible with that of pre-war days.

Mr. E. P. T. Chambers (South Eastern Gas Board): I should like to refer to a significant trend as a result of changes in design and operation. This is the increased coal throughput and thermal output with a much higher calorific value gas, but with a lower thermal yield per ton as made, subsequent to a reduction in the steam input. The equivalent thermal yield has, of course, thereby been increased. This same tendency has been evident in other carbonising plant—namely, intermittent vertical ovens.

In 1938 it was decided to reduce the steaming rate from 12% to 5% on a new installation of intermittent vertical ovens at Wandsworth, primarily to minimise the damaging effect of high rates of steaming and thus obtain a longer working life, but it was also proved that the thermal output as well as the calorific value were increased by working a faster carbonising cycle, although, of course, the thermal yield per ton was reduced.

Today, steaming rates of the order of 4% are normal practice. I would like to know if this reduced rate of steaming with production of higher calorific value gas is a condition of carbonisation of Durham run-of-mine coal in continuous vertical retorts, and I would also like to know the present rates of steaming employed. Lastly, although I understand that the effect of high rates of steaming are not so serious on continuous vertical retorts as on intermittent ovens, I would be glad to know if the author considers that this lowered steaming rate will have any effect in obtaining an extended life of the plant.

Gas-Making Value

Mr. A. J. S. Wiseman (North Thames Gas Board): As has been pointed out, the most difficult item to account for is the actual gas-making value or rank of the coal. Mention is made of the Assay test. This, of course, involves static carbonisation without steaming. Since this is also true of the whole of the full-scale coal gas manufacture at Beckton, it has been found possible over many years to assess accurately the changes in value for use at Beckton, of the coals delivered. This has been of material benefit in determining the cause of changes in thermal yield and in assisting the control of carbonisation. The relationship between the Assay test and continuous carbonisation with steaming is by no means clear. The equivalent thermal yield is a valid device not only for adjusting the results of separate tests on the same retort house, but also for comparing on a common basis the actual results obtained, from such widely different plant as horizontal settings and continuous vertical retorts. The use of assay results to predict the behaviour of a coal in continuous vertical retorts with steaming is, however, quite another matter and of very doubtful validity. I should like to ask Mr. Lewis what his experience has been in this matter.

As Mr. Lewis has said, changes in rank of coal have in the past been of minor significance. More recently we have found with Durham coals that, when expressed on a common basis as regards ash and moisture, the variation in assay yield, even if monthly samples of coal carbonised are taken,

may be as much as 5%. It is clear, therefore, that the unaccounted-for differences may in the future be so large as to outweigh the calculated items and vitiate the value of the tests made. I should like to ask Mr. Lewis if he has any ideas on how this difficulty can be overcome, and in particular does he think that the use of an intermediate scale test plant of, say, one setting of continuous vertical retorts with steaming, would be a practicable means of resolving the difficulty?

THE AUTHOR'S REPLY

Mr. Lewis, in reply, said: The Chairman is correct in assuming that Durham coals are regularly carbonised in continuous vertical retorts by the North Thames Gas Board and by other area boards. No great difficulties are involved, but, of course, the retorts work more easily with Yorkshire coals.

Dr. Pexton has admirably summarised the present position and rightly draws attention to the desirability of co-ordinating steam and power requirements with the reduced output of waste heat steam from modern retort houses, together with methods to be employed towards this end.

Mr. Cottrell's contribution representing the point of view of the contractors is most welcome, and I would like to endorse his remarks on the co-operation between the contractors and plant users. The subject of retort size and shape is, of course, very difficult, and Mr. Cottrell's comparisons indicate that large retorts appear to give better thermal yields than retorts of smaller size. However, these comparisons do not take into consideration the results obtained from the earlier installations at Bow Common and Fulham, and ignore the effect of changes in retort taper.

The original 103 in. retorts at Fulham produced only 76.9 equivalent therms per ton as compared with 80.3 equivalent therms from the 44 in. twin retorts. The view that large retorts are not capable of such high thermal yields as retorts of smaller size is thus supported for partially tapered retorts carbonising Durham coal. With Yorkshire coals the position is the same, since the comparison should be made between the 86.4 equivalent therms from the twin 44 in. retorts and either the 80.7 therms from the lambently heated No. 1 bench at Bow Common or the earlier result of 81.6 equivalent therms from the 80 in. Bow Common retorts of 1926. These results are not materially affected by changes in coal rank. The position is changed when comparing the Kensal Green twin retorts with installations of retorts with modified taper, and it is precisely this change which the modified retorts are intended to produce.

The major axis of the Bolton retorts was 63 in. at the top expanding to 76 in. in the upper 8 ft. 6 in.; the minor axis expanded from 10 in. at the top to 18 in. in the first 20 ft. The retorts are properly described as of 76 in. major axis. I regret that in the Paper they were incorrectly described as 63 in. This in no way affects the conclusions drawn from comparison between the Fulham and Bolton tests. The results obtained at Bolton showed 78.6 equivalent therms per ton—which was definitely better than the 75.5 therms obtained from the upwardly heated 103 in. retorts at Fulham in 1938. In the light of the knowledge available at the time it appeared justifiable to attribute the better result at Bolton to the smaller size of retort, and consideration of the Kensal Green results still lends support to this view. However, in the light of recent experience with more fully tapered retorts, it may well be that the major axis taper of the Bolton retorts contributed to the results obtained.

Economy in construction is facilitated by the adoption of a standardised design of retort, and the flexibility of the standard design is remarkable. A large proportion of the installations producing high calorific value gas from strongly swelling coals is in the London area, and the unique conditions obtaining in the North Thames Gas Board warrant an abnormal design of retort. It is not intended to suggest that the conclusions which have been reached as a result of investigations on Durham and other strongly swelling coals when producing gas of high calorific value are of universal application. The difference between large and small retorts and the effects of increased taper may tend to disappear with coals of lower swelling index and when producing gas of lower calorific values.

The results published for the Lausanne tests are certainly incomplete, and Mr. Cottrell's assumption may be correct. On this basis the equivalent thermal yield at Lausanne would be of the order of 88 therms per ton.

Dr. Weston has drawn attention to various means which are being adopted to improve comfort conditions in the retort house; this aspect of design is of great importance. The fuel consumption per ton of coal is, within limits, independent of the ash and moisture content of the coal. The thermal yield of gas is not independent of these variables, and since the equivalent fuel consumption is calculated from the fuel requirement *per therm* of gas produced, the basis of calculation of the therm yield must be defined. It is for this reason that the explanation of equivalent fuel consumption refers to the fuel requirement per therm of gas made from coal containing 8% ash plus moisture.

Mr. Saville has raised a number of interesting points. The bulk of the Yorkshire coals carbonised by the North Thames Gas Board is received in the form of screened washed nuts, whereas most of the Durham coals are run-of-mine. This fact in itself contributes to ease of travel through the retorts of the Yorkshire coals. A comparison between the performance with Durham nuts and Yorkshire nuts of the same swelling index would suggest that the difference lies in the plastic properties and swelling pressures of the two types of coal. The coke produced from Durham coal is in general of higher bulk density and more 'blocky' in nature than that from the Yorkshire coal. The last factor has a pronounced effect on coke extraction, and explains the tendency to reduce the distance between the centre of the extractor and the centre line of the retorts. The reactivity of the Durham coke may be less than that of the Yorkshire coke. There is little or no positive evidence as to any difference in efficiency of steam decomposition which may exist when producing gas with a calorific value of over 500 B.Th.U./cu.ft.

Gross coke and breeze yields are difficult to determine with precision. Carbonising Durham coals the yield from continuous vertical retorts is in our experience about 14.2 cwt. per ton of coal, and from intermittent vertical chambers approximately 13.5 cwt. The lower yield from the intermittent plant is associated with a higher H.E.V., which entails a smaller weight of solid residue together with the gasification of more carbon (either within the retort or externally) by steam to reduce the calorific value of the gas produced to 500 B.Th.U./cu.ft. There is insufficient information for a reliable comparison with horizontal retorts and coke ovens.

A Good Compromise

The present view on retort size is that small partially tapered retorts appear to give a higher thermal yield than large partially tapered retorts, but the difference may tend to disappear when carbonising less strongly swelling coals or with retorts of increased taper. In a modern installation the equivalent fuel consumption for a given type of coal will depend on the throughput per square foot of superficial area, and low fuel consumption is favoured by large retorts. A good compromise in this type of installation appears to lie in the region of 80 major axis.

Carbonisation in continuous vertical retorts is associated with both overcracking (where voids exist in the charge due to irregular coal travel) and undercracking due to the limited free space above the charge. Any increase in H.E.V. due to more regular coal travel therefore implies a reduction in the magnitude of overcracking and an increased tar yield. When comparing certain of the results reported in the tables, however, allowance must be made for the effect of coal rank. The lower rank of the coals carbonised during the test on Bow Common No. 2 bench largely accounts for the fact that the tar yield was higher than that obtained in the test on No. 1 bench. The normal volatile therm content of coke from continuous vertical retorts is 4-5 therms per ton of coke. The Board's usual policy is to carry out one interim repair to such parts of the retort face as have suffered serious spalling during the working life of the setting. The working life is generally terminated by a combination of distortion and spalling. Holes in the retorts are usually the end result of serious spalling which may penetrate to the tongued and grooved joints between the panel bricks. It follows that the actual working life varies according to the degree of spalling and the extent of the affected area. This varies with the design of the plant and the type of coal carbonised.

There is no reason to suppose that the test results are superior to those obtained in normal working; in fact the reverse may sometimes be true. Precise determination of the results obtained from a single retort house on a works where several houses are in operation are often obtainable only during performance tests.

Mr. Minchin refers to the overall thermal efficiency as being 88% to 90%. The 'Efficiency of Carbonisation,' which is $100\left(1-\frac{\text{Therms, Fuel}}{\text{Therms in Coal}}\right)$ certainly approaches 90% in a modern continuous vertical retort house, but the thermal efficiency of the works as a whole is, of course, less than this, as it must take into account steam raised in direct-fired boilers, electric power purchased, and the lower thermal efficiency of water gas plants. The 'Efficiency of Carbonisation' does not take credit for the production of waste heat steam. If this is allowed for the thermal efficiency of the retort house approaches 93%. The thermal requirement of 1½% claimed by Jansen is only to be achieved by almost complete elimination of thermal losses by radiation and as sensible and latent heat in coke and gas.

The gaseous thermal yield per ton of coal depends on the quality of the coal carbonised; that is one of the reasons for discrimination between the results obtained from Durham and from Yorkshire coals. The yields from good quality coals from a given field and of the same rank are, when reduced to a standard 'ash plus moisture content,' not significantly different. The coal core is, of course, at far too low a temperature to react with steam and it is for this reason that the coal core must be raised as the steam input is increased.

Several low temperature carbonising processes have employed some form of mechanical agitation as a means of increasing the rate of heat transfer. The development of a plastic stage followed by solidification to coke during the carbonising process implies a very large power consumption, while agitation necessarily results in the production of very small coke.

Well Deserved Tribute

Dr. Haffner has paid a well-deserved tribute to the stokers employed on the original installation at No. 4 house, Fulham, and has referred to the 1946-47 reconstruction. There were many factors to be taken into consideration when this reconstruction was under review. It was definitely felt that downward heating resulted in easier working conditions, but from the results obtained at Kensal Green it would appear that lambent heating might have been successful. The additional cost would have been considerable, and in all reconstructions of this nature the availability of special shapes or sizes of refractories, castings, etc., may exert a considerable influence on ultimate decisions.

The effect of the increased producer capacity on the performance of No. 4 house, Fulham, is difficult to assess. The results obtained from the earlier installations were probably not materially affected by shortage of producer gas owing to the virtual absence of labour difficulties. There is, however, no doubt that fire-cleaning, which was formerly a most arduous operation, is now much easier, and the increased producer capacity has materially improved working conditions. Bottom rodding in this installation is now virtually eliminated. As Dr. Haffner points out, there are three factors involved—namely, minor axis taper, modification to extractor design, and increased producer capacity. Each of these changes has contributed to the present ease of operation.

Coal segregation at Kensal Green is aggravated by the fact that two parallel rows of bunkers are supplied from a centrally-disposed overhead conveyor belt with a travelling throw-off carriage. This was arranged to discharge on to a travelling cross-belt which fed into the bunkers, and the flow of coal from the belt was controlled by a system of ploughs. Fine coal unfortunately passed under these ploughs and was preferentially delivered to that part of the hopper remote from the conveyor—that is, over the outside retorts. No modifications were successful in ensuring that this machine distributed coal uniformly over the whole width of the bunker, and its use was abandoned. The coal is now delivered from the main conveyor through an inclined chute. This has the equally unfortunate effect of throwing the larger coal to that part of the bunkers over the outside retorts. Even if the bunkers are filled from a central position, natural segregation causes the larger coal to be concentrated at the sides of the bunker, and during discharge the coal in the centre—which is of smaller than average size—is used first. Eventually a stage is reached where the larger coal, holding up on the sides of the bunker at the natural angle of repose, is discharged into the retort. There is thus a regular variation in the size of coal supplied to each retort. Small coal enters the retort shortly after filling the bunkers during the morning, and continues until some time during the night, when the retort suddenly receives a charge of large nut coal. This results in a regular cyclic variation of 15 to 30 B.Th.U./cu.ft. in the calorific value of the gas made, and the effect (which has been noted in other installations) is aggravated at Kensal Green by the fact that the bunkers are rather wide, shallow, and asymmetrical. One bunker was experimentally fitted with division plates of 'egg-box' pattern, as introduced by Imperial Chemical Industries. Vertical plates at right-angles were fitted into the bunker in such a way as to divide it into a number of cells 2 ft. 2 in. square. The plates at the centre of the hopper terminated some 2 ft. from the bottom; those towards the sides were shorter so as to provide clear communication between all the cells and the outlet. The division plates tend to prevent cross-flow and consequent segregation while the bunker is being filled. During discharge cross-flow is again prevented except at the bottom of the cells. Unfortunately the cells at the sides would not discharge, and the effective bunker capacity was seriously reduced. At the same time there was a tendency for wet fine coal to hang in the corners of the cells, and this would clearly have led to corrosion troubles. The plates were accordingly removed, and segregation in these bunkers is still a problem. It is hoped that conditions will be improved in the new installation at Kensal Green by the provision of taller, narrow, coal bunkers.

Mr. Clark has referred to coals of high swelling index and containing 20% of ash. We have no experience of coals of this type, but it would seem that the fuel consumption must be higher when carbonising such coals. The increased quantity of ash extracted from the producers will entail a marked increase in the loss of combustible matter with the clinker. The equivalent fuel consumption can, of course, be calculated for comparison with the results published in the paper, but a comparison of the performance with the results obtained from Durham and Yorkshire coals is not reliable. The fuel consumption is affected by the gross coke and breeze yield and by the way the coal behaves in the retort, which affects the throughput. The argument as to fuel consumption only envisaged a variation in ash and moisture content of some 3% or 4%; any extension of the principle to high-ash coals is probably quite invalid.

Mr. Walker has referred to the carbonising temperatures employed in the tests. These were not included in the published data as there is no co-relation between the temperatures employed in the three different heating systems referred to, and in all cases the optimum temperatures were arrived at by experiment before the tests were carried out. The average temperatures employed during some of the tests reported were as follows:

Downward Heating

	Yorkshire Coals (Bow Common, 1926)	Durham Coals (Fulham, 1949)
Top	... 1,380°C	1,362°C
Bottom (check tiles)	... 1,180°C	1,175°C

Upward Heating

	Durham Coal (Fulham, 1938)
Top	... 1,180°C
Bottom (check tiles)	... ... 1,351°C

Lambent Heating

	Durham Coals (K.G. Twin 44 in.)	(K.G. Twin 44 in.)	Yorkshire Coals (Bow Com.) (No. 1)	(Bow Com.) (No. 2)
6th Pass	1,072	1,066	1,061	1,096
3rd. ,,	1,326	1,322	1,344	1,338
2nd. ,,	1,332	1,331	1,344	1,314
1st. ,,	1,317	1,308	1,288	1,301

The life of refractories is intimately connected with the problem of spalling, and where the latter is the controlling factor in determining retort life a reduction in carbonising temperatures may change the location of the spalling zone without materially affecting the degree of spalling.

Mr. Chambers has commented on the tendency to increase coal throughput and calorific value by reducing the rate of steaming. The effect on thermal output is more marked in intermittent vertical chambers than in continuous vertical retorts. In the latter type of plant the daily thermal ouput of the retorts tends to be independent of the calorific value of the gas made. The thermal output of the works as a whole may be increased by production of high calorific value gas in the retort house coupled with dilution with gas made in external plant, and less oil will be required for enrichment in an associated carburreted water gas plant. With intermittent vertical chambers the volumetric output of the retorts tends to

be independent of the steam input, and the thermal output of the retorts is increased by raising the calorific value. The reduced rate of steaming is not a condition of carbonising Durham coals in continuous installations; this type of coal has been carbonised by the Gas Light and Coke Company and the North Thames Gas Board producing gas with calorific values down to 499 B.Th.U./cu.ft. The higher calorific values now produced result from a deliberate policy; the steaming rates employed are between 4% and 9% of the coal throughput. The efficiency of steam decomposition in this type of plant is much lower than in intermittent verticals. The spalling zone in continuous retorts is, of course, in the upper half of the retort, and erosion due to steam is so slight *over the range of calorific values encountered in the North Thames Gas Board* that the lowered steaming rate does not appear to have any appreciable effect.

Mr. Wiseman has focussed attention on a problem that is only just developing. Assay test results have been co-ordinated with full-scale results at Beckton after many years of experience in static carbonisation of Durham coals. and no attempt has been made to co-ordinate the assay test with results from continuous vertical retorts. Changes in coal rank are now of increasing significance, and the relation of assay test results to full-scale working results may change in consequence. In the case of the continuous retort, cracking conditions are very different from those obtaining in static systems, and it is at present only possible to assume that a coal which gives a poor result in the assay test will give a low yield in the continuous retort. The results from the continuous retort are so dependent on design that it might not be possible to obtain a universally applicable assay result from an intermediate scale test plant such as Mr. Wiseman suggests.

Book Review

INDUSTRIAL DEMOCRACY AT WORK*

IT is less than fifty years since what is understood by industrial democracy—the practice of joint consultation between management and workers, co-partnership, profit-sharing, welfare work, vocational training, and, generally, the square deal for employees—first came into practice to any material extent. This authoritative work is believed to be the first serious attempt to measure what effect these now widely-discussed developments have in the promotion of better industrial relations, whether they are really the right practices and, if so, whether we know how to apply them in the right way.

The book comprises a factual report on the experience of some 600 firms—a cross-section of British industry—and analyses the results on the basis of their own replies to an exhaustive questionnaire which is given in all its 63 sections as an appendix.

Our own industry may fairly be regarded as being a pioneer of co-partnership, and although we now retain no more than a sentimental memory of its many benefits, it may be of interest to refer briefly to the authors' conclusions on the subject. Outside this industry, co-partnership was never, apparently, very popular. The reason why the gas industry lent itself so well to co-partnership in the past was that in the nature of the industry there was a virtually constant demand for the product, a fixed rate of profit, and practically no personnel turnover. Where these happy conditions do not apply, it is not so easy.

The authors examined 13 examples of co-partnership in operation. The attitude of employees appears to be mixed, some being enthusiastic, others indifferent; the effect on efficiency and turnover also varies. A few individual views are of interest. 'The trade unions do not like it, as it runs entirely counter to their conception of an inevitable struggle between worker and boss.' 'The question of who owns the business does not much matter to the average worker; the thing that matters to him, besides wages and conditions, is the way he is treated by his managers. He prefers a cash bonus to bonus shares.' 'The idea of co-partnership must appeal to most progressive minds...' 'Financial results are too small individually to provide any incentive.' So much for co-partnership, which the authors are satisfied cannot have a universal application or a common form.

Profit-sharing, on the other hand, achieves beneficial results, the effects of which are to be recognised in the general morale of the enterprise, in the quality of output, and in the reduction of waste.

While the authors consider that financial incentives will continue to be the greatest single spur to effort, non-financial incentives will become increasingly important—particularly that of reasonable security of tenure, which can be provided by the giving of adequate notice before disposing of an employee's services. Particularly commended is the practice of increasing the period of notice with the length of service up to the point where an employee of 25 or more years' service can claim three months' notice.

An interesting view is expressed under the heading of organised welfare. The authors hold it to be desirable that such welfare as is not in the nature of things localised in the organisation—*e.g.*, canteens, clinics—should be linked up with the sporting, social, and cultural activities of the community in which the organisation exists. Managements should give the lead in this direction.

Education and training in industry receives detailed survey. Management, the authors assert, has an absolute duty to concern itself with the technical education of employees—especially in isolated and undeveloped areas. More could usefully be done in the way of temporary exchanges of personnel of all grades with other similar organisations. Little is done in most industries to prepare personnel for up-grading. In the industrial structure of the future there will be no place for nepotism of any kind or for the worn-out practice of automatic promotion by virtue of seniority of service. Vocational training was practised in one form or another by nearly three-quarters of the firms in the survey, though only a quarter operated systematic training for up-grading. Comments on training are interesting; one firm reported: 'Boys appreciative, girls acquiescent;' another: 'Boys acquiescent, girls tend to be resentful, especially when it encroaches on leisure.' Of 161 firms claiming to operate systems of training for up-grading, 117 were satisfied that the costs were amply justified.

The authors express disappointment at the relatively slight evidence of adequate steps to ensure that employees fully understand the conditions and prospects of their employment. Every employee should receive, at the time of his engagement, and for his own retention, a printed or typed statement of the conditions of employment and the reciprocal obligations entailed.

The subject of joint consultation receives the considerable attention its importance merits, which may be summed up in the authors' conclusion that some form of joint consultation will, and must, form an integral part of the industrial structure of the future—but, they emphasise, *not* made obligatory by Statute. Unless the two main groups in a particular enterprise are genuinely anxious to develop their common interest in its prosperity, such a body may in fact become merely another battle ground between them. Joint consultation will succeed only when those concerned want it to succeed.

This is a book which should be read by all employers of labour, managements and executives alike. Equally should it be read by trade unionists and all concerned with the solution of labour problems in industry. The general economic situation and the current direction of public conscience call imperatively for an entirely *de novo* approach from both sides to the problems of human relations in industry, and a survey of this kind will be of considerable value in formulating that new approach.

* A Factual Survey by W. Robson Brown, M.P., and N. A. Howell-Everson. Sir Isaac Pitman & Sons, Ltd.; 12s. 6d. net.

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SC/12

INVENTIONS . . . Abstracts from Recent Patent Specifications

WASHING BOILERS

Among recent patents is one taken out by Wilfrid Dean and W. H. Dean & Son, Ltd., for gas washing boilers (No. 648,051; complete specification published December 28, 1950). In such appliances the gas burner is sometimes located in a relatively inaccessible position which, unless some special provision for lighting the burner is made, renders the lighting of the burner difficult and sometimes dangerous. This danger, the patentees point out, is particularly present with boilers in which the burner is enclosed in a confined space.

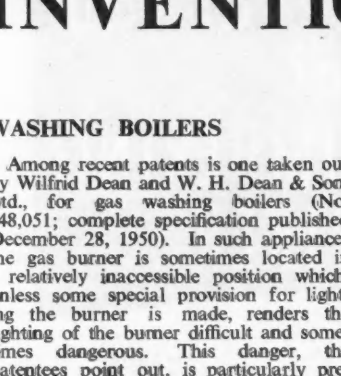


Fig. 1

To meet this difficulty, an arrangement is described in Specification No. 429,851, in which, upon turning on the gas, a small proportion of the total quantity issuing from the burner is directed along a duct (the 'flash-back duct') leading from a position, at the inner end of the duct, in the vicinity of the burner to a position exterior to the casing of the wash boiler, where it is ignited. The flame of the ignited gas then flashes back along the duct to the main body of gas issuing from the burner. The present invention involves the use of an arrangement of this general description.

There is provided a gas-fired washing boiler which comprises in combination a pan, a gas burner disposed beneath the pan, and in a relatively inaccessible position within a casing enveloping the pan, and a duct (constituting a 'flash-back duct') extending from the exterior of the casing to a position close to the gas burner, with its axis at the end of the duct adjacent the gas burner in alignment with at least one of the jets of the burner. The arrangement is such that, when the burner is turned on, gas issuing from it will be directed from the jet axially along the duct, at the outer end of which, remote from the burner, the gas thus directed into the duct may be ignited.

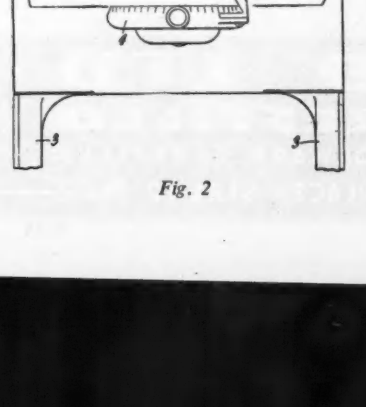


Fig. 2

Fig. 1 is a perspective view of a washing boiler constructed in accordance with the invention; Fig. 2 is a diagrammatic illustration of the lower portion of the washing boiler; Fig. 3 is a part plan view of the gas burner illustrated in that figure; and Fig. 4 is a section through Fig. 3 on the section line 3—3.

The gas-fired washing boiler there shown comprises an outer casing 1 within which the pan 2 of the boiler is suspended from a rim mounted at the top of the casing 1. The casing 1 is supported upon legs 3 and a gas ring 4 is supported on the casing below the pan 2.

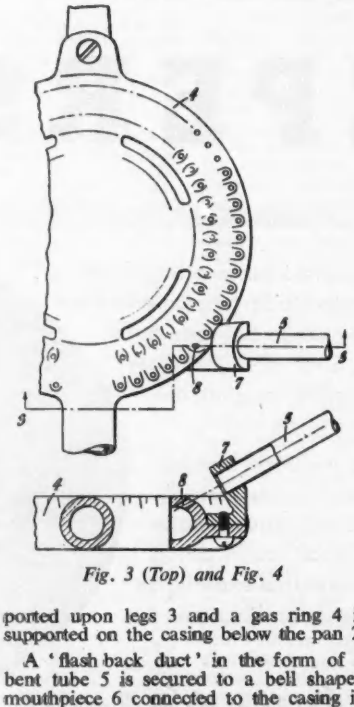


Fig. 3 (Top) and Fig. 4

A 'flash back duct' in the form of a bent tube 5 is secured to a bell shaped mouthpiece 6 connected to the casing in such a manner as to extend therethrough at its outer end. The inner end of the tube 5 extends into a bracket 7 secured to the burner 4 and is so positioned above the burner 4 as to collect gas issuing from a jet 8 disposed with its axis substantially in line with the axis of the inner end of the tube. The outer end of the tube is fixed in the mouthpiece 6, which in turn is held in position by a retaining ring 9. The tube 5 is preferably upwardly inclined from the burner 4 to facilitate the flow of gas along the tube to the outer end.

If desired, a pyrophoric device 10 may be mounted either in or adjacent to the free end of the mouthpiece 6.

A hole 11 is formed in the casing 1, the lower portion of the hole being provided with a highly polished metallic mirror 12 of stainless steel or chromium plated metal secured to the bottom of the hole in such a position that a reflected image of the jets of the adjacent side of the burner 4 can be seen in the mirror viewed in a downward direction from the outside of the casing. By this means the height of the flame of the gas burner 4 can be regulated with great facility, while it is a simple matter when applying a light to the mouthpiece 6 or operating the pyrophoric device to see whether the burner has been ignited. The edges of the mirror may be bent or curved downwardly to give rigidity to the mirror and prevent it from warping.

The inner end of the tube 5 may be located relatively to the burner by any suitable means, provided the inner end of the tube is definitely held in axial alignment with the jet 8 in the burner and with its extremity clear of the burner in the manner indicated in Fig. 4.

The jet holes of the burner 4 in the vicinity of the inner end of the tube 5, with the exception of the jet 8, are all formed so that the flames from the holes will be directed upwardly.

GAS-FIRED FURNACES

Improvement in gas-fired furnaces is the aim of a patent granted to John Fallon (No. 648,095; completed specification published December 28, 1950). The object of the patent is to provide an effective means of heating tubes, rods, bars, or other articles of considerable length during their passage through multi-burner furnaces of the tower type in which the waste gases jacket the incoming air so as to provide a pre-heating and thereby a more effective combustion of fuel. (A furnace of the tower type is disclosed in prior patent specification 255,935, Smallwood and Fallon).

The invention consists of an improved gas-fired furnace plant incorporating a plurality of furnaces of the tower type, embodying recuperative burners, characterised by the burner tubes being disposed in parallel at right angles to the line of traverse of the workpiece through the combustion chamber. Apertures in the combustion chambers of the burner towers are so arranged that a plurality of the burner towers are capable of aligned location to receive in succession the passage therethrough of a tube, rod, or bar, rollers being advantageously interposed between successive towers to provide a ready traversing motion.

Fig. 5 is a side elevation of such a furnace, one of the towers being shown in section; Fig. 6 is a plan of Fig. 5.

According to one means of carrying the invention into practice, the furnace

comprises a series of towers (4) in each of which is located a pair of tubular burners (1) spaced in parallel within converging gas combustion nozzles (2), the work being traversed through the combustion chamber at right-angles to the line of the tubular burners. The gas is supplied to the burners through inlet pipes (6) from the supply source. These burners are located at the lower end of air inlet pipes (7) on either side of which are passageways (8) for the waste gases from the combustion chamber (9) so that the incoming air is pre-heated before reaching the burners (1) and provides for a high degree of combustion within the chamber.

Located in the lower part of the tower is the combustion chamber (9) through which the work (3) can be traversed through aligned apertures in the walls of the combustion chambers which admit of the work being traversed below the burners and at right-angles to the line thereof. The gas flame is directed downwardly on to and around the work and the waste gases pass up the passageways (8) on opposite sides of the air inlet pipes (7).

Disposed in contiguity with the aligned apertures are live rollers (5) which assist the ready traverse of the work (3) through the furnace chambers. Desirably a series of recuperative towers (4) each providing a separate combustion chamber is disposed in alignment according to the nature of the work to be passed therethrough and the normal requirements of heating and time as determined by the characteristics of the work.

Each tower (4) may be mounted on flanged wheels (not shown) running on tracks which admit of a ready positioning and location of the separate towers. Intermediate each tower (4) is provided a roller traversing mechanism (5) for the workpiece to facilitate the passage of the work in the required manner and speed through the aligned combustion chambers.

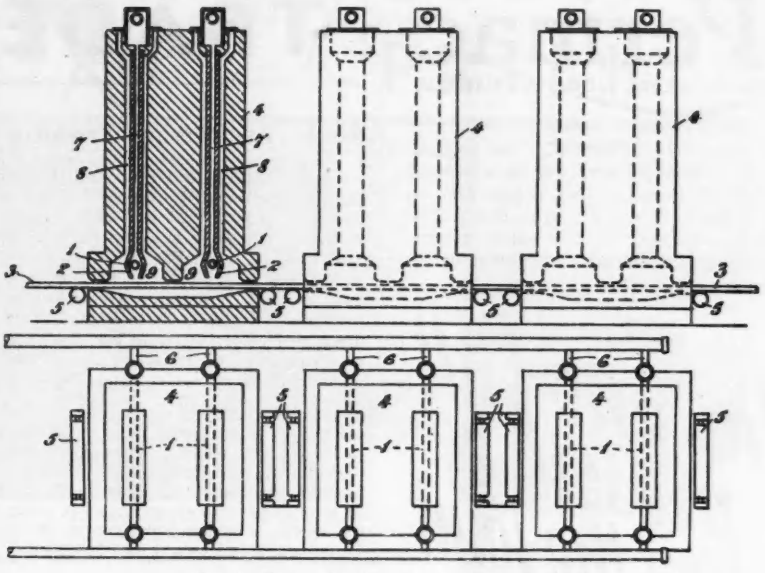


Fig. 5 (Top) Side Elevation, and Fig. 6 (Plan)

By this construction and arrangement a long workpiece can be heated to elevated temperatures and the gear on which the workpieces are traversed can be maintained in a relatively cool condition owing to its location between the exterior to the combustion chamber of each furnace. The arrangement is such that two or more recuperative burners are located transversely of the axial flow or traversing line of the tubes, rods, or bars, the temperature of the one furnace of a series being controlled by measurement of the temperature of the tube in the combustion chamber of the preceding furnace through which the workpiece is being passed.

IN PARLIAMENT —

(*Concluded from p. 352*)

Admission of the Press

The Public Bodies (Admission of the Press) Bill, the text of which was issued on January 31, is a private member's Bill which provides for the admission of representatives of the Press to the meetings of various public bodies specified in a schedule. The Bill presented by Mr. Martin Lindsay, Conservative member for Solihull, with the support of three other Conservative and eight Labour members, proposes that Press representatives should be admitted to the meetings of every body specified unless a resolution is passed by the majority of the members present at such a meeting that, because of the special nature of some business, it is undesirable in the public interest that Press representatives should be in attendance while that business is transacted.

The public bodies specified in the schedule to the Bill include the gas and electricity consultative councils, the consumers' council established under the Coal Industry Nationalisation Act, 1946, and the transport users' consultative committee established under the Transport Act, 1947.

The Bill is third in the list of private members' Bills set down for second reading on February 23.

DECLINE IN COAL STOCKS

ON Tuesday of last week Mr. Alfred Robens, Parliamentary Secretary to the Ministry of Fuel and Power, at a Press conference explained that distributed stocks of coal showed a further fall in the week ended January 20 to 10,652,000, but that the decrease (347,000) was less than that in each of the two previous weeks when stocks fell successively by 945,000 tons and 507,000 tons. The decline in stocks for the three weeks was therefore 1,800,000 tons compared with a fall in stocks of 1,253,000 tons in the corresponding three weeks a year ago—nearly 550,000 tons more taken from stock.

Production of coal in these three weeks was 12,428,000 tons and consumption 13,805,000 tons. The difference between these figures, said Mr. Robens, did not agree precisely with the change in stocks because of variations in certain factors such as the amount of coal in transit from collieries to consumers and imports. The main inference, however, was but little affected—that the fall in stocks this year is going on at a rate considerably in excess of that usually experienced.

Coal production in the week ended January 27 was 4,402,100 tons, compared with 4,383,200 tons in the corresponding week last year. In the four weeks ended January 27 this year deep-mined coal production was 16,179,400 tons compared with last year's figure of 16,064,200 tons, but with opencast production lower at 655,400 tons as compared with 934,300 tons a year ago there was a slight reduction in total output which amounted to 16,834,800 tons this year and 16,998,500 tons last year. The decline in opencast production was due to bad weather.

There were certain favourable factors to be taken into account, he continued, although they did not offer any substantial immediate relief to the position. Consumption of coal at electricity undertakings had decreased week by week since the beginning of this year, but the total of 3,189,700 tons compared with 2,807,100 tons last year. The easing in consumption of coal on electricity generation since the beginning of the year reflected the temperature conditions.

Concluding his statement, Mr. Robens remarked that there was evidence from inquiries received by the Ministry and from what was appearing in the Press that the public generally were becoming increasingly aware of the difficulties of the position, but the figures supplied did not reflect sufficient saving in fuel, and it was clear that there was every need for renewed emphasis upon fuel saving in every way and for continual attention to fuel efficiency in its widest applications.

Permac
METAL-TO-METAL JOINTING MATERIAL

Ever since 1913 "PERMAC," the original Metal-to-Metal Jointing, has been holding up difficult joints in Gas Works and on Coke Oven Plants all over the world. Equally suitable for any joint—steam, water, gas, oil, benzol, ammonia, etc.—screw pipe or flange.

Instant full pressure when the joint is made

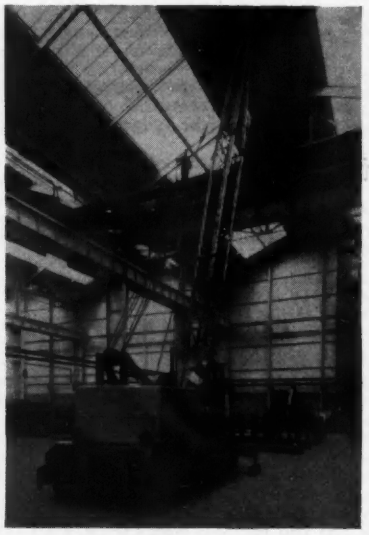
THOMAS & BISHOP LTD.
39, ARTHUR ROAD, LONDON, S.W.19.

TRADE NEWS

Steels Engineering Products

Coles 'MILO' mobile crane, manufactured at Crown Works, Sunderland, is equipped with a strut jib which can be varied in length to suit the work upon which it is engaged. When equipped with a 30 ft. centres jib it will lift 20 long tons at 10 ft. radius, but alternative jib lengths are available up to 80 ft. centres, when this powerful crane can lift loads to a height of 83 ft. above the ground and out to as great a radius as 74 ft.

This model may be alternatively diesel/electric or petrol/electric and it operates on the Coles variable voltages system with its many advantages in operation, including simplicity of control, accuracy of movement, smooth acceleration, creeping speeds, lowering under power and an automatic speed/weight compensation.



Loads up to 10 long tons may be lifted and carried by the crane with outriggers housed, but it is considered sound crane practice to handle heavier loads with the telescopic outriggers extended, and this adjustment by the slinger takes only a few seconds. The superstructure slews 360° in either direction without limitation and the driver, seated in a forward position, has a perfect view of the load and hook in all positions.

Interesting safety devices in this modern giant include the safe load indicator, safety limit switches on the hoist and derrick motions, patented reversible steering and the slewing safety clutch. The brakes are electro-magnetic and applied automatically to the hoist and derrick motions, so that the crane operator is not confused by a multitude of levers. The travel speed is up to eight miles per hour and the crane moves easily on 10 pneumatic tyres, while the hoist speed varies in accordance with the weight that is being lifted.

The Aerograph Co., Ltd.

A new type of air brush, type NSA, has been produced for the commercial artist and photographer. Full particulars are available from dealers or from the manufacturers at Lower Sydenham, London, S.E.26.

Ashmore Benson, Pease

The Northern Gas Board have placed an order for a new gasholder for Stockton, to cost about £100,000. The site of the proposed holder has not been definitely decided, as Stockton Corporation has appealed against the site originally selected by the Board. The holder will be of 3 mill. cu.ft. and will double the existing capacity at Stockton.

Air Control Installations, Ltd.

The above firm announce the opening of a branch office at 70, Mosley Street, Manchester (Tel.: Central 0679) under the managership of Mr. F. Wright, A.M.I.E.E., A.M.I.H.V.E. From these new quarters the sales and technical staff will be in a position to deal with enquiries for fans and all types of air treatment plant, including equipment for dust and fume extraction; humidification; ventilation; air conditioning, heating, cooling and filtration; steam removal; pneumatic conveying; drying, etc.

Chaseside Engineering Co.

A booklet entitled 'Does the Chaseside Shovel Really Pay for Itself?' puts down lucidly and dramatically relative costs of loading mechanically and manually. Dealing mechanically it compares costs when the shovel is run on petrol and diesel fuel oil. It is worth looking through as the answer to the question is very interesting.

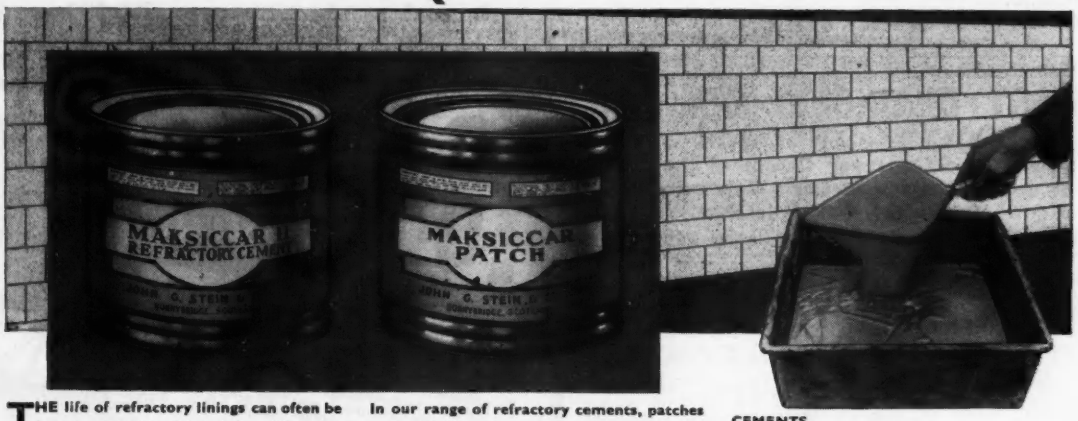
Nife Batteries

Safety lamp type G.10 has been designed to provide a safe light in dangerous atmospheres. The lamp case is made throughout of stout gauge sheet steel welded at all joints and nickel plated. The battery is of the Nife Nickel Cadmium Alkaline type giving a continuous light of 10 hours per charge. Weight: Approx. 4 lb. Dimensions: 2⅛ in. by 4½ in. by 5½ in., excluding handle. Copies of Publication 2850 are obtainable from the maker's works, Redditch, Worcs.

Parkinson & Cowan Engineering Division

A brochure produced by Parkinson & Cowan (Gas Meters), Ltd., Engineering Division, Cottage Lane Works, City Road, London, E.C.1, describes their infra-red tunnels and panels, conveyors, spray and industrial finishing equipment and all accessories. Their plant, which is in use in many countries, includes 2 ft., 3 ft., and 4 ft. dia. tunnels and horizontal and vertical radiating panels. Unit construction allows additions to be made to plant without re-arrangement, and any maintenance can be done on site.

STEIN Refractory CEMENTS AND PATCHES



THE life of refractory linings can often be improved by the right choice of jointing cement. The best cement to use will depend on the specific conditions in the furnace concerned. Similarly in the use of refractory patches to repair damaged brickwork, or to replace special shapes in certain conditions, much better results will be obtained from the material with properly balanced properties.

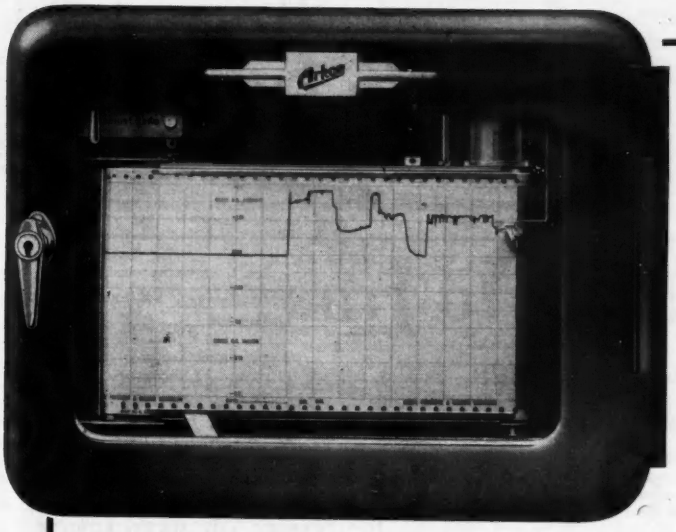
In our range of refractory cements, patches and castable refractories, users will find a selection of high quality materials which can be relied on for a uniform high standard of quality. Full particulars are given in our **REFRACTORY CEMENTS AND PATCHES** pamphlet and we are always glad to give advice on the best application of our products.

CEMENTS
MAKSICCAR FIRE CEMENT
MAKSICCAR II DRY REFRACTORY CEMENT
STEIN SILLIMANITE
NETTLE REFRACTORY CEMENT

PATCHES
MAKSICCAR PATCH
STEIN SILLIMANITE PATCH
STEIN 73 PATCH
STEIN CHROME PATCH

CASTABLE REFRACTORIES
STEIN REFRACTORY CONCRETE
STEIN BAFFLE MIX

JOHN G. STEIN & CO. LTD., BONNYBRIDGE, SCOTLAND



Before ordering another Draught or Pressure Recorder — send for details of the new

Arkon MODEL 1600

The ARKON Model 1600 will interest everybody who uses instruments

Write for Pamphlet No. P.M.25.

The ARKON Model 1600 is a new instrument for the measurement and recording of pressure or draught, or a combination of both. It provides a high degree of accuracy, sensitivity and a high magnification of very low readings. A simple design combined with a robust construction makes the ARKON Model 1600 particularly suitable for work in difficult conditions, as in gas works, coke oven plants, steel works, foundries, etc.

The wide rectangular chart is easily read by unskilled operators. The chart mechanism has many new features so that it requires less attention to maintain a close and continuous record.

WALKER, CROSWELLER & CO. LTD., WHADDON WORKS, CHELTENHAM, GLOS.

Phones — Cheltenham: 5172 London: HOLborn 2986 Manchester: Blackfriars 0058

J. BROWN & CO. LTD.
SAVILE TOWN, DEWSBURY, YORKS.
Supply:–
"BROWNOX-de-LUXE" PURIFYING MATERIAL
Purchase:–
SPENT OXIDE

EWART CHAINBELT CO., LTD.
DERBY, ENGLAND
Driving and Conveyor Chains of the best quality; made of Ley's Celebrated Blackheart Malleable Iron.
ALSO COMPLETE CONVEYORS AND ELEVATORS

SPECIALISTS in ERECTION, DISMANTLING, ETC., GAS PLANT, GASHOLDERS, PURIFIERS, FACTORY BUILDINGS, SHEETING, GLAZING.
W.D. (SHEETERS) LTD.
BARCLAYS BANK CHAMBERS, OWEN STREET, TIPTON, STAFFS.
Telephone: TIPTON 1958.

THOMAS BUGDEN & CO.
India-Rubber and Airproof Manufacturers and General Contractors.
LARGEST MANUFACTURERS OF GAS MAIN BAGS.
Telegrams—"AIRPROOF, BARB, LONDON." Telephone—6147 CLERKENWELL
Contractors to H.M. Government

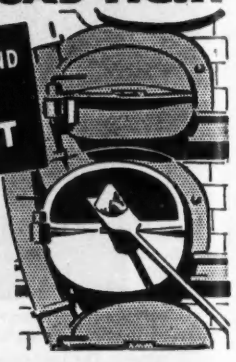
Gas Bags for Repairing Mains
PATENTEES OF THE
DENMAR BAG
Impervious to Main Liquor and Climatic Influences.

Round or Cylinder Shape.
Pull-through and Expanding MAIN STOPPERS.
All types of INDIA-RUBBER BOOTS.
DRAIN RODS AND WHALE-BONE BRUSHES.
HOSE AND TUBING FOR ALL PURPOSES.

Contractors' & Miners' Woollen Jackets, Trousers, Hats, &c.

Stokers' Mitts and Gloves of every description.
244, Coswell Road, LONDON, E.C.1

GAS METER CRANKS
Telephone: DUNSTABLE 90
The Clifford Engineering Co., Ltd.
Dunstable, Beds.
Specialists for over 30 years
Annual production over 700,000 cranks

RETORTS MADE GAS TIGHT
when patched with–
ONX SUPER 83 BRAND FIRE CEMENT
A recent testimonial from Gas Dept.
"We are pleased with results obtained after using ONX Super '83' Brand.
"Our settings were very bad, with large cracks in retorts, and portions of wall actually collapsed.
"Now, six months after repairing 28 retorts they appear as sound as ever; we anticipate the life of the settings will be prolonged."

A. L. CURTIS & CO., *Westmoor Works,* **CHATTERIS,** *Cambs., Eng.*

EB Service in
WELDING
SPRAYING
GUNNING
of
GAS RETORTS
Write for particulars of how E.B. experience can help in reducing maintenance costs in refractory constructions.
Manufacturers of all types of Cements.
E. B. REFRACTORY CEMENT CO. LTD.
OAKFIELD OFFICES, BRETTELL LANE, STOURBRIDGE

ALEXANDER WRIGHT & CO LTD
1, Westminster Palace Gardens, WESTMINSTER, S.W.1
INSTRUMENTS for Works and Laboratory.
"Dead-Beat" Recorders and Indicators:
Types and ranges for Works' District, Laboratory, Testing Stations.

OXIDE
DUTCH AND DANISH BOG ORE SPECIALLY ACTIVATED OXIDE OF IRON
Oxide supplied on loan or sale outright.
Highest prices paid for Spent Oxide.
Send your enquiries to
GAS PURIFICATION & CHEMICAL COMPANY LIMITED
ESTABLISHED 1873
PALMERSTON HOUSE, OLD BROAD STREET, LONDON, E.C.2.
Telegrams: "Purification, Stock, London." Telephone: London Wall 5077

"KLEENOFF"
THE COOKER CLEANER
Tins for Sale to Consumers. In Bulk for Works Use
OXIDE OF IRON.
BALE & CHURCH, LTD.
33, ST. MARY AT HILL, LONDON, E.C.3.
Telephone: Mansion House 1156. Telegrams: "Balefire, London."

The
LIMIT OF EFFICIENCY CAN BE REACHED
by the use of
LUX
GAS PURIFYING MATERIAL
Sole Importers:
HARRISONS (London) LIMITED
66, Mark Lane, LONDON, E.C.3
Telegrams: Birchrock, London Telephone: ROYal 3120

PUBLISHERS' NOTICE

The "Gas Journal" is published every Wednesday, price 1/-; by post 1/2d.

NEW SUBSCRIPTION and CLASSIFIED ADVERTISEMENT RATES OPERATING FROM JAN. 1, 1951.

Subscription Rates: Home and Empire :- 52/- per annum; Foreign :- 60/- per annum. (Both payable in advance.) A copy of the "Gas Journal" Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 1/9 per line (approx. 7 words) - minimum charge 10/6. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10" deep x 7" wide; block screen 120.

BUSINESS MANAGER: S. T. CULLEN

MIDLANDS OFFICE: 10, Union Street, Birmingham.

NORTHERN MANAGER: W. Q. Foster, 33, St. Helens Road, Harrogate. 'Phone: Harrogate 84291.

WALTER KING, LTD., 11, Bolt Court, Fleet Street, London, E.C.4.

Telephone: CENtral 2236-7. Telegrams: Gasking, Fleet, London.

APPOINTMENTS VACANT

THE WOODALL-DUCKHAM COMPANY

TRAINING SCHEME FOR OPERATING ENGINEERS.

THE WOODALL-DUCKHAM COMPANY offers training facilities in gas and coke making processes, including the heating up and putting to work of Continuous Vertical Retorts, Intermittent Vertical Chambers, Coke Ovens and By-Product Plants, together with some experience in Laboratory work and Plant Construction. Permanent positions on the Outside Operating Staff will be available to suitable men at the end of the 4 to 5 years' training period.

Applicants should be between 18 and 23 years old and progressive salaries will be paid according to age, education and previous experience, if any.

Applications, with full particulars, should be sent in the first instance to: The Personnel Officer, The Woodall-Duckham Company, 63-77, Brompton Road, London, S.W.3.

SCOTTISH GAS BOARD

DUNDEE GROUP.

FORFAR DISTRICT.

APPLICATIONS are invited for the appointment of Technical Assistant. Applicants should have the Higher Grade Certificate of the Institution of Gas Engineers (Manufacture) with a sound practical knowledge of gasworks practice, carbonisation in continuous vertical retorts and supervision of labour.

The salary will be A.P.T. Grade V Provincial "B" Scale (£370-£450 per annum) and placing in the scale will be according to qualifications and experience.

The successful candidate will be required to pass a medical examination, and the appointment will be subject to the provisions of such Superannuation Scheme as may be adopted by the Board.

Applications, stating age, experience, qualifications, etc., together with *copies* of 2 recent Testimonials or names of referees, should be made to the undersigned not later than 14 days from the publication of this advertisement.

THOMAS NAPIER,
District Manager.

NORTH WESTERN GAS BOARD

BLACKBURN GROUP.

SHOWROOM ATTENDANT, DARWEN.

APPLICATIONS are invited from suitably qualified persons for the position of SHOWROOM ATTENDANT in charge of the Showroom at the Darwen Undertaking.

Applicants must have had experience of Showroom supervision and sales, and preference will be given to holders of the Institution of Gas Engineers' certificate in gas salesmanship and consumer service.

The appointment will be subject to the conditions of service as agreed by the National Joint Council for Gas Staffs from time to time, and the commencing salary, which will be according to ability and experience, is in A.P.T. Grade V, Provincial "A," with the following range :—

Males ... ... £385 × £20 to £465 max.
Females ... ... £308 × £16 to £372 „

The successful applicant may be required to pass a medical examination, and to subscribe to such scheme of superannuation as the Board may adopt.

Applications, giving age, details of qualifications and experience, together with the names and addresses of two persons to whom reference may be made, should be forwarded to the undersigned within 14 days of the publication of this advertisement.

A. H. NICHOLSON,
General Manager.

Cardwell Place,
Blackburn.

THE Civil Service Commissioners invite applications for at least two pensionable appointments as ASSISTANT INSPECTION OFFICER in the Gas Standards Branch of the Ministry of Fuel and Power.

Candidates must be at least 19 and under 25 years of age on February 1, 1951; extension allowed for service in H.M. Forces.

Candidates must possess a School Certificate with a credit in mathematics or a science subject or produce evidence of having passed an examination of equivalent or higher standard.

Salary scale (men) in London, £210 × 20—£430; starting pay according to age subject to a maximum of £330 at age 25 or over on entry. The salary scale for women is somewhat lower. Prospects of promotion.

Particulars and application forms from Secretary, Civil Service Commission, Scientific Branch, Trinidad House, Old Burlington Street, London, W.1, quoting No. S4003/51, completed application forms must reach him by March 15, 1951.

10216/100/JLH.

THE Ministry of Fuel and Power is prepared to consider applications for the appointment of EXAMINERS, Gas Standard Branch, in the London area.

QUALIFICATIONS. Possession of an honours degree in Physics with Chemistry as a subsidiary subject, or an honours degree in Chemistry with Physics as subsidiary subject, is desirable. Some post-graduate research experience would be an advantage.

DUTIES. Investigation of chemical and physical problems associated with the official testing of gas for calorific value, purity, pressure, composition, etc., testing of gas meters, development of methods of testing gas and gas meters and the examination of prototypes of instruments and meters.

SALARY. Within the range £475 (age 25) × £25—£750 per annum, subject to an upper limit of £600 at age of 30 or over on entry. Upper age limit 35.

The appointments are temporary but opportunities may occur to compete for established posts.

Apply for application forms to the Ministry of Labour and National Service, Technical and Scientific Register (K), York House, Kingsway, London, W.C.2, quoting F.5/51/A. Closing date March 3, 1951.

H.Q. 1216-20. 1/51. A.B.

WEST MIDLANDS GAS BOARD

WORCESTERSHIRE-HEREFORDSHIRE DIVISION.

REDDITCH DISTRICT.

ENGINEERING DRAUGHTSMAN.

APPLICATIONS are invited from suitably qualified persons for the above position.

Candidates must be experienced in general engineering draughtsmanship and should have knowledge of the design and construction of gas works plant and buildings.

The salary for the post will be not less than £520 per annum on commencement, rising by annual increments to a maximum of £620 per annum in accordance with Grade IX of the salary scales of the National Joint Council for Gas Staffs.

The appointment will be subject to such Superannuation Regulations as the Board may, in due course, adopt, and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience and accompanied by the names of two referees, should be addressed to Mr. C. F. W. Rendle, Divisional Manager, West Midlands Gas Board, 12, St. Nicholas Street, Worcester, to reach him not later than fourteen days after the appearance of this advertisement. Applicants are requested to quote Ref. T.P.3 when replying to this advertisement.

F. H. CURETON,
Secretary.

WEST MIDLANDS GAS BOARD

WARWICKSHIRE DIVISION.

COVENTRY DISTRICT.

RETORT AND BUILDING SUPERVISOR.

APPLICATIONS are invited from suitably qualified persons for the above position at Foleshill Gas Works, Coventry.

Candidates should have a good knowledge and experience of the construction, starting-up, repair and maintenance, and temperature control, of Vertical and Horizontal Retort Settings.

A good knowledge of foundations and general building construction is also essential, together with ability to control all grades of refractory and general building trades labour.

The commencing salary will be within the range £595 to £720 per annum, in accordance with Grade XI of the Salary Scales of the National Joint Council for Gas Staffs.

The appointment will be subject to such superannuation regulations as the Board may, in due course, adopt, and the successful candidate may be required to pass a medical examination. A four-roomed flat is available at a reasonable rent, if required.

Applications, giving details of age, qualifications and experience, together with the names of two referees, should be addressed to Mr. A. Allen, Divisional Manager West Midlands Gas Board, Warwickshire Division, Gas Street, Coventry, to reach him not later than fourteen days after the appearance of this advertisement. Applicants are requested to quote Ref. T.P.3, when replying to this advertisement.

F. H. CURETON,
Secretary.

WEST MIDLANDS GAS BOARD

WARWICKSHIRE DIVISION.

COVENTRY DISTRICT.

SENIOR ENGINEERING DRAUGHTSMAN.

APPLICATIONS are invited for the positions of two SENIOR ENGINEERING DRAUGHTSMEN on the Constructional Staff at Coventry but successful candidates may be required to carry out or supervise work at any of the Undertakings within the Division.

Candidates must be experienced in engineering draughtsmanship, in the design and layout of Gas Works Construction and erection of plant and buildings and in the preparation of estimates, specifications and builders quantities. It will be an advantage if applicants have had experience in the Drawing Office of a Gas Plant Contractor.

The salary for the post will be not less than £570 per annum on commencement, rising by annual increments to a maximum of £670 per annum in accordance with Grade X of the salary scales of the National Joint Council for Gas Staffs.

The appointment will be subject to the provisions of such a superannuation scheme as the Board may, in due course, adopt, and the successful candidates may be required to pass a medical examination.

Applications, giving details of age, qualifications and experience, together with the names of two referees should be addressed to Mr. A. Allen, Divisional Manager, West Midlands Gas Board, Warwickshire Division, Gas Street, Coventry, to reach him not later than fourteen days after the appearance of this advertisement. Applicants are requested to quote Ref. T.P.3. when replying to this advertisement.

F. H. CURETON,
Secretary.

(Classified advertisements continued on Supplement 4)

APPOINTMENTS VACANT (ctd.)

WEST MIDLANDS GAS BOARD

WORCESTERSHIRE-HEREFORDSHIRE DIVISION.
WORCESTER DISTRICT.
TECHNICAL ASSISTANT.

APPLICATIONS are invited from suitably qualified persons for the position of TECHNICAL ASSISTANT—Worcester District. The position calls for experience in the technical control of Continuous Vertical Retorts and C.W.G. Plant.

The salary for the post will be not less than £450 per annum on commencement, rising by annual increments to a maximum of £530 per annum in accordance with Grade VII of the salary scales of the National Joint Council for Gas Staffs.

The appointment will be subject to such superannuation regulations as the Board may, in due course, adopt, and the successful candidate may be required to pass a medical examination.

Applications, stating full particulars of age, experience and qualifications, should be addressed to : Mr. C. F. W. Rendle, Divisional Manager, West Midlands Gas Board, 12, St. Nicholas Street, Worcester, to reach him not later than fourteen days after the appearance of this advertisement. Applicants are requested to quote Ref. T.P.3 when replying to this advertisement.

F. H. CURETON,
Secretary.

NORTHERN GAS BOARD

MIDDLESBROUGH DIVISION.
ENGINEERING DRAUGHTSMAN.

APPLICATIONS are invited for the appointment of ENGINEERING DRAUGHTSMAN AND TECHNICAL ASSISTANT in the Middlesbrough Unit. The appointment will be subject to the conditions of service applicable to gas staffs.

Applicants should have experience in the design and construction of Gas Works' Plant, preferably with a Gas Works' Plant manufacturer.

Salary will be within the range of Grade VI Provincial A, of the National Scale for Gas Staffs (£415 per annum rising to £495) according to experience. Flat is available, if required, at reasonable rent.

Applications, with the names of two referees, are to be sent to the Undersigned as soon as possible but not later than 9 a.m., on February 20, 1951.

JOHN W. PALLISTER,
Divisional General Manager.

Gas Works,
Commercial Street,
Middlesbrough.

NORTHERN GAS BOARD

SUNDERLAND DIVISION.
DRAUGHTSMAN.

APPLICATIONS are invited from suitably qualified persons for the position of SENIOR DRAUGHTSMAN at the Sunderland Unit.

Applicants should be experienced in the design and layout of Gasworks construction, erection of plant and buildings, etc., and preferably trained with a Gas Undertaking or a Gas Plant Contractor.

The successful candidate will be required to pass a medical examination and the appointment will be subject to the provisions of such superannuation scheme as may be adopted by the Board.

Salary—Grade A.P.T. VIII, scale (£490/570), and conditions in accordance with the Agreement of the National Joint Council for Gas Staffs. Commencing Salary commensurate with qualifications and experience.

Applications stating age, experience and qualifications giving names of two referees, should be addressed to the undersigned within fourteen days of the issue of this advertisement.

W. O. KIRKWOOD,
Divisional General Manager.

Fawcett Street,
Sunderland.

NORTHERN GAS BOARD

(STOCKTON DIVISION)
TECHNICAL ASSISTANT (DISTRIBUTION)—
THE HARTLEPOOLS UNIT.

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT (Distribution) to the Hartlepools Unit.

The commencing salary will be £375 per annum rising to £420 per annum by annual increments of £15.

The successful candidate may be required to pass a medical examination and the appointment will be subject to such Superannuation regulations as may, in due course, be made.

Candidates should at least possess the Ordinary Grade Certificate in Gas Engineering (Supply), and have experience in domestic and industrial utilization of gas, the promotion of gas sales, and the laying of mains and services.

Applications stating age, qualifications and experience together with two recent Testimonials, should be forwarded to F. J. WEBSTER, Engineer and Manager, The Northern Gas Board (Stockton Division), The Hartlepools Unit, Middleton Road, West Hartlepool, not later than February 28, 1951.

F. L. SCAIFE,
Divisional General Manager.

EAST MIDLANDS GAS BOARD

NOTTS. AND DERBY DIVISION.
CHIEF INSTRUCTOR.

APPLICATIONS are invited for the post of CHIEF INSTRUCTOR of the Board's Training Centre which is to be established at Long Eaton, near Nottingham. The commencing salary will be not less than £750 per annum.

Candidates should have a wide knowledge of the Gas Industry, particularly on the Distribution and Sales and Service side. Possession of both the First Class City and Guilds Certificate in Gasfitting and the Higher Grade Certificate in Gas Engineering (Supply), together with a knowledge of Sales and Service practice and procedure will be necessary qualifications. The successful candidate will be responsible to the Board for the initiation, organisation and running of approved courses of training applicable to the Board's employees.

The successful applicant will be required to pass a medical examination and the appointment will be subject to such superannuation scheme as may be adopted by the Board.

Applications, stating age, qualifications and experience, together with details of present and previous appointments and giving the names of two referees, should be sent to the undersigned to reach him not later than February 28, 1951.

A. GWYNNE DAVIES,
Secretary.

Beverley House,
University Road,
Leicester.

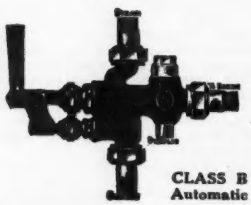
APPOINTMENT WANTED

FITTINGS INSPECTOR desires change. Aged 31. Married. 10 years' experience. Accustomed to estimating, advising, supervision and control. Medium sized Undertaking, Possesses Final City and Guilds, and the Ordinary Grade Supply. Excellent references. Anything considered. Housing accommodation essential. No. 9950, Gas Journal, 11, Bolt Court, Fleet Street, London, E.C.4.

REPAIRS

BRIGHT, SON & CO.
(CLERKENWELL) LTD.
FOR PUBLIC LIGHTING.
CLOCK CONTROLLER REPAIRS.
20 Northburgh St. Clerkenwell, E.C.1. Clerkenwell 7171. and at **17 & 18, Gt. Sutton St. Clerkenwell, E.C.1. London Wall 0267.**

BUFFALO INJECTOR
(British Made)



CLASS B Automatic

Operated entirely by one handle

GREEN & BOULDING, LTD.
162a, DAISTON LANE, LONDON, E.8

HUMIDINE
NON-SETTING PAINT
Used by the leading Gas Companies for the protection of lower plates and cuppings of Gasholders. The most efficient anti-corrosion paint in existence. HUMIDINE never cracks, never dries and is absolutely impervious to water. OXYGRAFITE GASWORKS PAINT is also manufactured by . . .
ASPINALLS
(PAINTS) LIMITED
CARLETON · SKIPTON · YORKS
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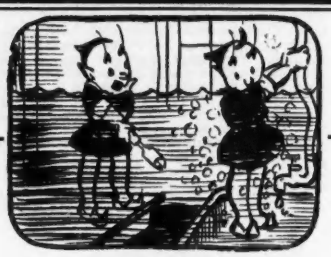

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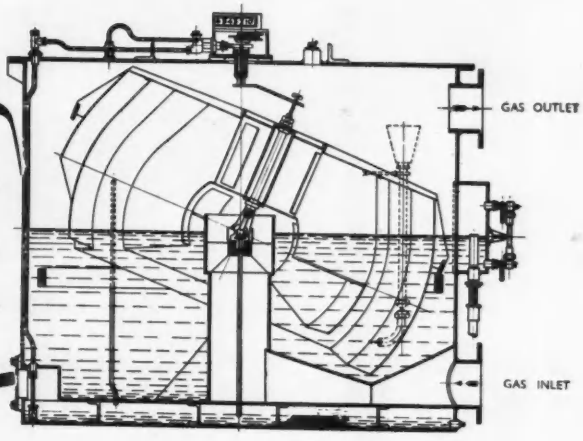

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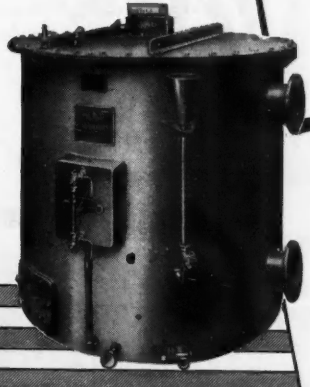

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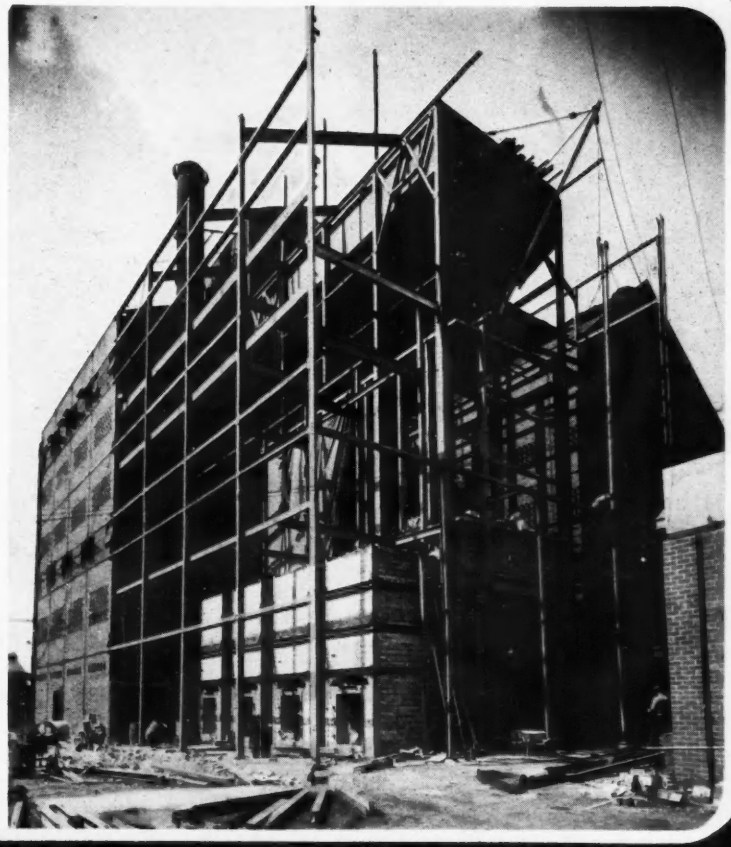

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